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1964
1964

CAMBRIDGE WATER BOARD.

1899.

President.

JAMES M. W. HALL.

Members of the Board.

FRANK A. ALLEN	Term expires 1899.
GEORGE H. HOWARD	Term expires 1900.
JAMES M. W. HALL	Term expires 1901.
STILLMAN F. KELLEY	Term expires 1902.
WELLINGTON FILLMORE	Term expires 1903.
WALTER H. HARDING, Clerk.	

Superintendent of Works.

EDWIN C. BROOKS.

Water Registrar.

WALTER H. HARDING.

Trustees of Sinking Fund of Water Loan.

**THE MAYOR, CITY TREASURER, AND PRESIDENT
OF THE COMMON COUNCIL, ex officio.**

CAMBRIDGE WATER BOARD.

Date of election and length of service of members, 1865-99.

CHESTER W. KINGSLEY	.	1865-1894
JOHN SARGENT	. . .	1865-1871
A. K. P. WELCH	. . .	1865-1871
ROBERT DOUGLASS	. . .	1865-1871
SAMUEL SLOCOMB	. . .	1865-1876
Z. L. RAYMOND	. . .	1871
HENRY L. EUSTIS	. . .	1871-1885
J. WARREN MERRILL	. . .	1871-1881
GEORGE P. CARTER	. . .	1871-1883
JOHN H. LEIGHTON	. . .	1876-1879
KNOWLTON S. CHAFFEE	. . .	1879-1889
JAMES M. W. HALL	. . .	1881- (Now in Office.)
LEANDER M. HANNUM	{	1883-1884 1885-1893
JOHN F. O'BRIEN	. . .	1884-1895
GEORGE H. HOWARD	. . .	1889- (Now in Office.)
E. BURT PHILLIPS	. . .	1893-1896
STILLMAN F. KELLEY	. . .	1894- (Now in Office.)
FRANK A. ALLEN	. . .	1895- (Now in Office.)
WELLINGTON FILMORE	. . .	1896- (Now in Office.)

Presidents of the Board.

J. WARREN MERRILL	. . .	1865-1867
EZRA PARMENTER	. . .	1867
JOHN SARGENT	. . .	1867-1871
J. WARREN MERRILL	. . .	1871-1873
CHESTER W. KINGSLEY	. . .	1873-1876
GEORGE P. CARTER	. . .	1876-1883
CHESTER W. KINGSLEY	. . .	1883-1894
JAMES M. W. HALL	. . .	1894-

REPORT OF THE CAMBRIDGE WATER BOARD.

CAMBRIDGE, December 20, 1898.

To the Honorable, the City Council of the City of Cambridge

The annual report of the Cambridge Water Board for the year ending November 30, 1898, is herewith submitted for your careful consideration.

Last year we called attention to the fact of the completion of our work in the development and enlargement of the Stony Brook system.

When the City Council, on October 27, 1897, celebrated the completion of that work — which embraced the new high service reservoir at Payson Park, the new twenty million gallons pumping engine, and the two storage basins at Hobbs Brook — they believed at a completed system, but not a complete supply of water to properly furnish that system, and the natural question of a well came to many minds as to the probability of the large lower basin being filled within a reasonable time. Our part of the work had been done — How long should we have to wait for what was so necessary to really complete the work — an ample supply of water?

It should be remembered that before the Water Board decided to construct a large basin at Hobbs Brook they had accumulated sufficient data from actual observation and measurements to determine that with an average yearly rainfall, about 2,500,000,000 gallons of water per year could safely be depended upon as a normal supply from Hobbs Brook, independent of Stony Brook, or a full year's supply for our City, based on an average daily use of 7,000,000 gallons — which was about the consumption the last year, and should a rainfall com-

siderably above the average occur, we could store sufficient water to fill the basin and rely upon Stony Brook proper for the City supply during such period of accumulation. As no unusual yearly rainfall had occurred since 1890, and as 1888 and 1889 were the last years of extraordinary rainfall, we reasonably assumed by the rule of averages that 1898 would be likely to witness an abnormal rainfall. Hence the finishing work of riprapping the new basin was pushed late last Fall, and by somewhat vigorous measures the contractor was forced to deliver the basin to our care before the Winter storms set in.

On December 16, 1897, the gates at Winter Street dam were shut and the large lower basin began to be filled. The upper, or smaller, basin was already full. Beyond our most sanguine expectations have been the results. The rainfall the last year has been 52.42 inches. As a result, in less than eight months, or on August 21, 1898, the large basin was full to overflowing so that it became necessary, on November 1, 1898, to remove the top flash boards in the gate house at Winter Street dam to reduce the over supply and although eight inches of water stored were thus given liberty, yet little decrease was effected. The basin has continued nearly full—grade 181—and today the water stands at 180.93 with thirty-six million of gallons per day running to waste at Winter Street dam. As one inch of water in this basin means 15,000,000 gallons, it can readily be seen what an enormous amount of water Hobbs Brook is capable of storing and supplying; and confirms the wisdom of the plans made for the development of our Stony Brook system rather than a union with the very costly and to us less satisfactory Metropolitan water system.

Whatever other cities or towns may or do need as to the Metropolitan supply, Cambridge does not, and with proper care and utilization of what she has within reach will not need any other source of supply than Stony Brook for many years to come.

Should it ever be necessary to supplement the system as now completed and store an additional supply, it could be secured by building a dam at or near Beaver Pond, the head of Stony Brook, and should our City introduce the dual system—utilizing the waters of Charles River for purposes other than domestic—to

which for the last two years we have called the attention of the City Council, it seems reasonable to believe that we shall have a water Cambridge is likely to require for over a generation, especially if, as will probably be the case at some future time, water is all furnished through meters at meter rates.

The amount of water that has run to waste the last year over Stony Brook spillway and into Charles River is 5,704,600,000 gallons, which is equal to two years' supply, and indicates the possibilities of Stony Brook and its tributary, Hobbs Brook, as a water supply, should it be necessary at some future time to construct another storage basin. Since the connection was first made of Stony Brook and Fresh Pond, November 6, 1887, there have gone to waste into Charles River 62,608,186,076 gallons of water, or twenty three years' supply, based on present rate of consumption. And this is in addition to what our City has used.

The consumption of water has increased the last year 261,592 gallons per day over that of the preceding year. This is owing largely to the increased pressure because of the entire City being supplied from Plover Park high service reservoir. As we have in previous reports suggested when the daily consumption amounts to 8,500,000 gallons the capacity of our present delivery pipe connecting Stony Brook with Fresh Pond will have reached its limit and another pipe should be laid large enough, with the present pipe, to keep Fresh Pond full and equal to any future demand of our water takers and equal to the largest daily supply of water our Stony Brook system is capable of furnishing. The cost of this will be about \$400,000, and is likely to be needed before many years, although it is hoped it may not be necessary until our water receipts shall be considerably in excess of the present revenue.

In this connection we suggest that care should be exercised by the City Council not to reduce existing water rates. Should water rates not be sufficient to meet fixed charges and other necessary expenditures, the deficit must be provided from the general tax levy. This has never been necessary so far in the history of the water works. It is hoped it never will be. Up to this time our taxpayers have never been assessed one dollar to pay for the cost of the water works system other than what is

paid by them for the use of water. There is nothing in the domestic expenses of our citizens where they receive so much for so little as in the water they use.

Our financial statement this year is of more than ordinary interest because we can now present with approximate correctness the total cost of the development of the water system now completed and paid for, after six years from its commencement in 1893.

The total cost of the water works up to Novem-

ber 30, 1892	\$3,195,214.38
And up to November 30, 1898	5,602,364.56
	<hr/>
Increase in six years	\$2,407,150.18
Deduct amount expended for General Construc-	
tion	160,165.97
	<hr/>
	\$2,246,984.21

This amount (\$2,246,984.21) represents the cost of the work the last six years, as already described.

In detail, the cost of each department of the new work has been as follows:—

1. Payson Park high service reservoir, including engineering and police service . . .	\$286,947.65
2. Land for same (11 acres)	37,784.25
3. New pumping engine, including foundation, inspection and Mr. Leavitt's services	138,501.42
4. New boilers, alteration to engine house and boiler room, including services of Mr. Leavitt	58,475.24
5. New forty-inch main, including Venturi meter	203,229.93
6. Construction of Hobbs Brook basin, upper and lower	785,869.06
7. Dams at Winter and Lincoln Streets . . .	156,079.58
8. Land taken for Hobbs Brook reservoir (1,000 acres)	233,914.65
9. Fresh Pond land	156,873.68
10. Fresh Pond improvements	189,308.75
	<hr/>
	\$2,246,984.21

Of the entire cost of the water works to date (\$5,602,364.36) \$3,242,100.00 are represented by outstanding unmatured bonds. The balance has been paid, and in addition is the amount paid into the sinking fund to redeem bonds not yet matured.

The value of the sinking fund we are not as yet able to state accurately, as we have not been able to get the figures from the City Treasurer. It should be about as follows:

Amount in fund November 30, 1897	\$464,118.38
Earning in 1898	18,647.83
Amount paid into sinking fund November 30, 1898	103,656.00
	\$586,112.21
Interest bonds paid maturing July 1, 1898	12,500.00
	\$573,612.21

From this \$573,612.21 must be deducted the premiums paid for bonds purchased by the Commissioners during 1898, the amount of which premiums we have no knowledge of.

There are no more bonds maturing until November 1, 1906, and a large amount until 1910. For detailed financial statement we refer you to the annual reports of the Registrar and Treasurer on Accounts.

The income from water rates has been disappointing, so that the year closes with a small deficit, although we have in every respect kept within our appropriations except abatement and refund, which cannot ever be accurately estimated.

The unusually small number of new houses erected the past year, the reduced receipts because of the extension of the water system and the reduction in water rates made by the City Council early in the year have all contributed to this result. Besides these causes our City water is no longer sold at 12 cts. per 100 gallons, where, until lately, we received \$6,000 per year.

Renovals and Construction.

During the four past years, in anticipation of the increased pressure from high service, all of the old cast-iron pipe and even larger of the old iron pipe have been removed, and the entire system is now in better condition than ever before. The

tails of this are given in the Superintendent's report. The amount paid for renewals the last four years is \$142,000.00. It is not probable that much will be needed for further renewals for some time.

During the year, Mr. E. C. Brooks, who, since Mr. Harrington's death, has been Acting Superintendent, was chosen Superintendent and Mr. E. I. Harris appointed Chief Engineer to succeed Mr. Brooks.

Our City is to be congratulated in having men of such ability in charge of such responsible positions.

Pumping Station, Fresh Pond.

During the early part of the year, the new pumping engine, after being fully tested, was accepted by Mr. Leavitt, who planned it for the City, and we are assured that it is the finest and most complete pumping engine of its character in the United States. It is proving all that was anticipated, and should be, for many years, a source of pride and congratulation for the perfection of its mechanism and the economical results secured.

The two ten million gallons pumping engines have been altered during the year so as to be auxiliary to the large engine in case of necessity. The high service engines of 2,000,000 and 1,000,000 gallons formerly supplied the standpipe; the smaller of these two will be sold.

With the new floor laid during the year and the walls painted, and new front door placed, the engine house is in better condition than ever before and with the new engine in operation it is a sight which our citizens should not fail to see and will be well repaid for inspecting.

Fresh Pond.

No work was done around the pond this year until late in the Fall because of failure of the City Council to appropriate anything for this purpose until too late to be of much service.

It can hardly be considered wise or economical to allow the incomplete work on the westerly side of the pond to remain in an unfinished condition. It should be taken hold of promptly another year when the season opens and a reasonable appropriation made to properly complete it.

The borders of Fresh Pond will surely be one of the most attractive features of our park system in the future, and should be laid out in harmony with the other parts of the park system, although from their location they are properly under the care of the Water Board.

All cost of the land and its improvements have been met or will be met from water receipts, either direct or through bonds raised by water receipts. It is a question to be now considered whether a permanent improvement like the work referred to should not in part at least be provided for by bonds.

The last unsettled claim for land taken around Fresh Pond in 1894 has recently been adjusted by compromise, after two years' delay.

The Fitchburg Railroad, early in the year, removed their tracks from the Fresh Pond area and payment was made as indicated in our last report.

We are pleased to include these two items among the completed facts of the last year.

Cambridge Reservoir.

As the old reservoir has not been used for nearly a year, and as this site is valuable for residential purposes, some steps should be taken during the coming year to dispose of it and the proceeds added to the sinking fund of water works, as the City will not use the property further for water purposes.

Payson Park Reservoir.

The grating has been completed during the year, and the surroundings are finished other than some little grating and the completion of Elm Street, through which run the forty-inch pipes and to very nearly. This work is to be done in connection with the Payson Park Land Trustees and only awaits their arranging with the aldermen for the Water Board to do its part.

Stony Brook Reservoir.

The Pond here is in fine condition, and the keeper, Mr. Silas Baxter, has been vigilant and faithful, as usual, in his duties at this very important point in the water works system.

It is a position requiring constant watchfulness, being the

main artery of our water supply, as it is from this point the pipe starts that connects Stony Brook with the City of Cambridge.

Hobbs Brook Reservoir.

The keeper's house, corner of Lincoln Street and the County Road, was completed late last year and Mr. J. E. Bryant was appointed keeper—his duties embracing the care of the upper and lower basins. The duties have been faithfully and satisfactorily attended to. The condition of the basin is excellent and the cleanliness of the shore and protection from washing away in time of high winds and waves fully justify the action of the Water Board in having the riprapping thoroughly done before allowing water to accumulate in the basin.

The water in the basin having been so quickly stored, no vegetable growth developed nor is likely to, and hence the conditions, as Professor Sedgwick recently remarked, are "well nigh perfect," and the water being well settled before it leaves the basin must be as good water as any city in New England has.

During the year, Dr. Greenwood, of Waltham, our medical inspector, has made a careful survey of Hobbs Brook and all its tributaries and reports everything in excellent condition and the sources to be so located as to almost preclude any possibility of defilement.

He has also made a thorough inspection of Stony Brook proper and its tributaries. Several cases from which there might possibly enter some objectionable matter have been attended to, and early in the Fall the members of the Water Board made a personal examination, with him, of all these points and found them satisfactory.

When we contrast the present conditions of Stony and Hobbs Brooks with what existed when we first commenced taking water from that source we are sure that the water this year is purer than ever before and our citizens need not resort to the use of so-called spring water for their drinking supply.

We believe if the State Board of Health will sustain the protective law as related to water supplies passed in 1897 no apprehension need exist as to any future defilement.

During the early part of last Fall information came to us from reliable sources that a plan was formulated for the erection of a

large slaughtering establishment close to Cherry Brook an important affluent of Stony Brook in South Lincoln.

A conference was held with the Selectmen and local Board of Health of Lincoln with the result of a joint petition of Cambridge and Lincoln, in which Waltham, Lexington and Weston are joined, to the State Board of Health, requesting action on their part in conformity with the act of 1897 to prevent the erection of the slaughter house. Subsequent to this a special town meeting was called in Lincoln, where, by a decided majority, a license was refused to the petitioners.

It is hoped the State Board of Health will realize the gravity of such cases and in the spirit and letter of the act of 1897 protect the citizens of the Commonwealth against all such plans which are a menace to the public health and comfort.

It may be well to secure additional legislation the coming Winter which shall further discourage all such plans that are made with little regard to public health.

The Water Board, recently, in furtherance of co-operation with the State Board of Health decided to purchase the Sargent place in South Lincoln, as being the only solution of what has been, ever connected with Stony Brook, a difficult problem to solve. An appropriation will soon be asked for this.

There now remains unsettled of the Hobbs Brook land taking some 2000 square feet, settlement for which will probably not exceed a few hundred dollars, and this will complete the settlement for lands taken at Hobbs Brook.

Office Work.

The Water Registrar, Mr. W. H. Harding, who is also Clerk of the Board, has carefully attended to the duties of his department and with entire satisfaction to the Board.

Although the work of this office has so largely increased during the last four years, only two additional assistants have been appointed. The cost of the office has increased but fifteen hundred dollars in five years. The employees have been faithful, attentive and conscientious, as always.

The Assistant Superintendent, Mr. C. H. Parker, has attended to his varied duties with promptness and efficiency, as usual.

Most of our citizens are not probably aware that the calls on

the Water Department are similar to those on the Fire Department. Any break or leak must be responded to at any and all times, night or day, in all weathers, no matter what the exposure is. We perhaps too seldom recognize the value to our comfort and safety of the men who, occupying humble and often unnoticed positions, do such excellent service with pick and shovel, often involving great discomfort and always hard manual labor.

The faithful services of our permanent employees are cordially commended.

New Stable.

It became necessary the past year to build a new brick stable at the Auburn Street pipe yard and to make some changes in the house of the keeper there, as well as other changes in the line of economical handling of supplies which the old buildings do not afford. The work has been well done at a cost of about seven thousand dollars, and is a credit to the City. The Superintendent's report refers to this in detail.

We are glad to refer to the cordial relations that have existed between the Water Board and the Chief Executive of our City and the City Council—being a continuation of the unbroken and mutually pleasant relations and confidence that have ever marked the history of the Water Board and its relation to the Mayors and City Councils of our City.

The harmony that has existed in the councils of our Board with so many perplexing and important problems to solve during the last four years—the most important four years of its history—is one of the compensations for the service rendered the City—a service that will, we are confident, more and more commend itself to our fellow citizens by the results already achieved and the possibilities of the future.

JAMES M. W. HALL,
WELLINGTON FILLMORE,
STILLMAN F. KELLEY,
FRANK A. ALLEN,
GEO. H. HOWARD,
Cambridge Water Board.

REPORT OF THE WATER REGISTRAR.

WATER REGISTRAR'S OFFICE,
Cambridge, December 7th, 1896.

To the Cambridge Water Board:

Gentlemen In compliance with the requirements of the City Ordinance, I present the thirty-fourth annual report of the operations of this department, showing the receipts, expenditures and statements, together with a statement of the number of water taken, etc., for the year ending November 30, 1896.

Amount due to amounting unpaid November 30, 1896:

Water taken	\$22 00
Water taken	10 00
Supplies and repairs	600 00
Light and	125 00
Gas	10 00
Repairs	25 00
Materials and	25 00
Interest on bonds	100 00
Amount due to amounting unpaid November 30, 1896:	
Water taken	\$22 00
Water taken	10 00
Supplies and repairs	600 00
Light and	125 00
Gas	10 00
Repairs	25 00
Materials and	25 00
Interest on bonds	100 00
Total	\$825 00
Amount due to amounting unpaid November 30, 1896:	
Water taken	\$22 00
Water taken	10 00
Supplies and repairs	600 00
Light and	125 00
Gas	10 00
Repairs	25 00
Materials and	25 00
Interest on bonds	100 00
Total	\$825 00

WATER REGISTRAR.

Rents	353.01
Maintenance account	1,331.46
Construction account	693.99

There has been abated:—

Water rates, off and on, seals and rents	\$5,262.79
Supplies and repairs	18.30
Construction account	22.80
Maintenance account	13.50

There remains unpaid:—

Water rates	\$154.85
Meter rates	1,176.42
Supplies and repairs	1,270.24
Off and on	124.00
Seals	10.75
Maintenance account	79.15
Construction account	76.38
	<hr/> \$317,770.94

Expenditures.

Construction account (general)	\$26,007.47
Construction account (Fresh Pond Reservoir)	5,734.83
Construction account (Hobbs Brook Reservoir)	182,619.92
Construction account (Payson Park Reservoir)	39,787.66
Construction account (Fresh Pond land)	62,288.57
Maintenance account (general)	28,736.52
Maintenance account (office)	5,739.26
Maintenance account (pumping)	14,136.52
Maintenance account (renewal of mains)	15,534.91
Maintenance account (Stony Brook Reservoir)	1,310.98
Maintenance account (Hobbs Brook Reservoir)	859.97
Maintenance account (Payson Park Reservoir)	940.09
Maintenance account (Fresh Pond Reservoir)	8,853.51
Supply account	5,064.46
	<hr/> \$397,614.67

Abatements.

Water rate bills to the amount of	\$5,262.79
Maintenance bills to the amount of	13.50
Supply and repair bills to the amount of	18.30
Construction bill to the amount of	22.80
	<hr/> \$5,317.39

Refunds.

Water rates to the amount of	\$3,163.74
Which amount deducted from the receipts	300,293.52
Leaves net receipts for water	<hr/> \$297,129.78
Add off and on, rents, seals and maintenance account	2,538.22
Makes net receipts of "rates, fines, etc."	<hr/> \$299,668.00

Off and On.

Water has been shut off for non-payment of rates or per order on account of vacancy, and seals have been applied to fixtures by request of owners, as follows:—

Water shut off in 1898	687
Supplies let on, shut off in 1898	529
Supplies let on, shut off in previous years	98
New supplies let on	249

Sum. - as applied to Balance in 1900	1 25
Sum. - as removed put on in 1900	60
Sum. - as removed put on in previous years	00

This year the City of Somerville has taken on her water system which was formerly supplied by the City of Cambridge, and the resultant effect of a shrinkage of about six thousand dollars in receipts.

Statement of the yearly revenue received from water rates and the purchase of the works by the City.

From April 1, 1881 to December 1, 1881	\$1,287.19
From December 1, 1881 to December 1, 1882	2,072.37
From December 1, 1882 to December 1, 1883	1,722.02
From December 1, 1883 to December 1, 1884	4,707.02
From December 1, 1884 to December 1, 1885	7,100.30
From December 1, 1885 to December 1, 1886	7,000.00
From December 1, 1886 to December 1, 1887	11,702.00
From December 1, 1887 to December 1, 1888	17,391.30
From December 1, 1888 to December 1, 1889	16,117.22
From December 1, 1889 to December 1, 1890	12,034.37
From December 1, 1890 to December 1, 1891	17,000.00
From December 1, 1891 to December 1, 1892	17,100.00
From December 1, 1892 to December 1, 1893	16,000.00
From December 1, 1893 to December 1, 1894	17,000.00
From December 1, 1894 to December 1, 1895	17,000.00
From December 1, 1895 to December 1, 1896	17,000.00
From December 1, 1896 to December 1, 1897	17,000.00
From December 1, 1897 to December 1, 1898	17,000.00
From December 1, 1898 to December 1, 1899	17,000.00
From December 1, 1899 to December 1, 1900	17,000.00
From December 1, 1900 to December 1, 1901	17,000.00
From December 1, 1901 to December 1, 1902	17,000.00
From December 1, 1902 to December 1, 1903	17,000.00
From December 1, 1903 to December 1, 1904	17,000.00
From December 1, 1904 to December 1, 1905	17,000.00
From December 1, 1905 to December 1, 1906	17,000.00
From December 1, 1906 to December 1, 1907	17,000.00
From December 1, 1907 to December 1, 1908	17,000.00
From December 1, 1908 to December 1, 1909	17,000.00
From December 1, 1909 to December 1, 1910	17,000.00
From December 1, 1910 to December 1, 1911	17,000.00
From December 1, 1911 to December 1, 1912	17,000.00
From December 1, 1912 to December 1, 1913	17,000.00
From December 1, 1913 to December 1, 1914	17,000.00
From December 1, 1914 to December 1, 1915	17,000.00
From December 1, 1915 to December 1, 1916	17,000.00
From December 1, 1916 to December 1, 1917	17,000.00
From December 1, 1917 to December 1, 1918	17,000.00
From December 1, 1918 to December 1, 1919	17,000.00
From December 1, 1919 to December 1, 1920	17,000.00
From December 1, 1920 to December 1, 1921	17,000.00
From December 1, 1921 to December 1, 1922	17,000.00
From December 1, 1922 to December 1, 1923	17,000.00
From December 1, 1923 to December 1, 1924	17,000.00
From December 1, 1924 to December 1, 1925	17,000.00
From December 1, 1925 to December 1, 1926	17,000.00
From December 1, 1926 to December 1, 1927	17,000.00
From December 1, 1927 to December 1, 1928	17,000.00
From December 1, 1928 to December 1, 1929	17,000.00
From December 1, 1929 to December 1, 1930	17,000.00

Comparative Statement (Continued).

1897.	Maintenance account, excess of receipts	\$20,303 88	
	Supply account, excess of receipts . . .	1,136 13	
	Excess of total receipts over total expenditures	\$21,440 01	
	Transferred to Construction Account (Fresh Pond Reservoir)	16,972 74	
	Balance carried to Sinking Fund .		\$4,467 27
1898.	Maintenance Account, excess of expenditures	\$4,497 79	
	Supply Account, excess of receipts . . .	971 57	
	Excess of total expenditures over total receipts		\$3,526 22

By comparing the above table of receipts from water rates it will be seen that our annual average increase has fallen off in 1898, as compared with recent years.

The loss in revenue is due, principally, to the small number of dwellings erected during the last year, the few fixtures added in dwellings already erected, the abatement of a large number of hose charges on account of the wet season, and the setting of meters to cover domestic consumption, and a reduction in the rates for metered water.

The only water rate charges made in 1898 remaining unpaid are for additional fixtures and for metered water, to the amount of \$963.17 out of a total of \$306,000.00. Of the amount unpaid (\$963.17) nearly seven hundred dollars (\$700.00) is due from a corporation whose affairs are in the hands of assignees and the court has issued an injunction restraining the City from collecting the bill by the ordinary methods. Deducting this bill from the total amount unpaid leaves water bills remaining unpaid to the amount of two hundred sixty-five dollars (\$265.00).

In addition to the manufactories, etc., supplied through meters, water is supplied to 19,892 families, 892 stables, with 3,107 horses and 210 cows; 334 shops; 821 stores and offices, by the following fixtures, viz:—

- 23,751 faucets,
8,193 wash basins,
10,150 wash tubs,
6,945 bath tubs,
374 slop closets,
19,596 pan closets,

10 motors.
- 6 hopper closets,
90 urinals,
17 yard hydrants,
4 fountains,
45 tumbler washers,
1,926 hand hose,

1. The following is a list of the premises in the city of Boston, where the water is supplied by the city, and where the water is not supplied by the city, and where the water is not supplied by the city.

2. The following is a list of the premises in the city of Boston, where the water is supplied by the city, and where the water is not supplied by the city, and where the water is not supplied by the city.

3. The following is a list of the premises in the city of Boston, where the water is supplied by the city, and where the water is not supplied by the city, and where the water is not supplied by the city.

Respectfully submitted,

WALTER H. HARRIS.

Regulator.

ANNUAL STATEMENT

OF THE

WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DEC. 1, 1898.

Water rates unpaid November 30, 1897	\$772.01
Supplies and repairs unpaid November 30, 1897	1,444.28
Off and on bills unpaid November 30, 1897	122.00
Seals unpaid November 30, 1897	14.25
Rent unpaid November 30, 1897	26.66
Maintenance account unpaid November 30 1897	32.50
Construction account unpaid November 30, 1897	168.03
	<hr/>
	\$2,579.73

Bills placed in hands of City Treasurer for collection from December 1, 1897, to December 1, 1898:—

Water rates from annual ledgers	\$214,994.50
Water rates from fractional ledger	10,236.46
Water rates from meter ledger	80,846.11
Off and on water	726.00
Rent	326.35
Seals	164.75
Supply and repair bills	5,880.29
Maintenance account	1,391.61
Construction account	625.14
	<hr/>
	315,191.21
Total bills	<hr/> \$317,770.94

There has been collected:—

Annual ledgers	\$211,337.02
Fractional ledger	9,109.12
Meter ledger	79,847.38
Off and on ledger	691.00
Rent ledger	353.01
Seal ledger	162.75
Maintenance account	1,331.46
Construction account	693.99
Supply and repair account	6,036.03
	<hr/>
Total collections	\$309,561.76

There has been abated:—

Water rates, off and on, and seals	\$5,262.79
Maintenance account	13.50
Supply account	18.30
Construction account	22.80
	<hr/>
	\$5,317.39

STATEMENT OF THE WATER REGISTRAR.

21

Amounts received and expended

Water rates

\$ 21 3

Expenses and repairs

1 7 34

of said

1 21 20

Balance

1 21 3

Amount received from

1 21 3

for the year ending

1 21 3

1 21 3

Amount received from

1 21 3

for the year ending

1 21 3

for the year ending

1 21 3

for the year ending

1 21 3

for the year ending

1 21 3

1 21 3

Attest

WALTER H. HORDING,

Registrar.

Committee, December 15th, 1898

Resolved, that the accounts of the Water Registrar and the amounts received and expended in the amounts collected, stated, respectively, correspond with the statement submitted by the City Auditor and the City Auditor.

FRANK A. ALLEN,

STIMON F. KELLY,

Committee
on
Accounts

CITY OF CAMBRIDGE,
OFFICE OF THE CITY TREASURER,
December 1, 1898.

To the Cambridge Water Board:

Gentlemen:—I give you herewith a record of the transactions between the Water Office and the City Treasurer's Office during the year ending November 30, 1898.

Gross collections for account of "Water Works, Rates, fines, etc."	\$306,763.07
Abatement certificates received and paid on "Water Rates" . . .	5,276.29
Gross collections for account of "Water Works, Supply Account" .	6,654.33
Abatement certificates received and paid on "Supply Account" . .	18.30
"Refund" certificates have been presented and paid to the amount of	3,163.74
Uncollected bills in my hands November 30, 1898, for account of	
"Maintenance, Construction and Water Rates," amount to . . .	1,621.55
Uncollected bills in my hands November 30, 1898, for account of	
"Supplies, Repairs, etc.," amount to	1,270.24
Gross Collections for account of Water Works, "Construction, Gen-	
eral, Account	76.73
Gross collections for account of Water Works, "Construction, Hobbs	
Brook Account"	576.26
Gross collections for account of Water Works, "Construction, Pay-	
son Park Account"	41.00
Gross collections for account of Water Works, "Maintenance, Gen-	
eral Account"	1,344.96

Very respectfully,

WILLIAM W. DALLINGER,

City Treasurer.

I have examined the above statement and find it correct.

HARRY T. UPHAM,

City Auditor.

REPORT

OF THE

SUPERINTENDENT OF WATER WORKS.

Cambridge, December 1, 1898.

To the Honorable Water Board of the City of Cambridge.

In compliance with the City Ordinance, I herewith submit the thirty-fourth annual report of the Superintendent, ending November 30, 1898.

Consumption.

The total quantity of water pumped during the past year was	2,792,321,110 gallons.
Daily average water pumped during the past year was	7,650,195 gallons.
Quantity of water used for domestic purposes	602,565,725 gallons.
Quantity of water used for sprinkling streets	3,900,000 gallons.
Quantity of water used for flushing sewers	1,250,000 gallons.
Quantity of water used for cleaning canals	7,500,000 gallons.
Quantity of water used for fire fighting purposes	12,600,000 gallons.

Quantity of water used for fire fighting purposes	727,842,525 gallons.
Quantity of water used for fire fighting purposes	2,064,478,585 gallons.

Number of gallons daily for each inhabitant on the total amount pumped, 53.69

Number of gallons daily for each inhabitant on the total amount used for domestic purposes, including water for private as well as public buildings and fire purposes, 67.15

The increase in the consumption of water during the past

year must be accounted for largely by waste due to the increase of pressure throughout the City.

The amount of main pipe that has been renewed during the past four years, together with the supplies on the same, make it evident that in so far as the main pipe and street connections are concerned the works have never been in as good condition as at present.

I would recommend that the supplies for all public buildings be metered that we may be able to account as far as possible for the total consumption of water.

There have been installed during the past year four recording gauges, in the different parts of the City, to record the variation of the water pressure. One is located at No. 4 Engine House, North Cambridge; one at the City Hall; one at No. 3 Engine House, East Cambridge; and one at No. 7 Engine House, at the lower Port. The record sheet covers one week; all sheets are changed the same day and filed at the water office.

The grade of each gauge is taken and is recorded on the sheets as they are taken off, so that all the pressures can be referred to same datum line.

It may be of interest to know that during the recent large fire at the J. P. Squire establishment, in East Cambridge, the pressure at that point was fully up to the maximum pressure there before the increase made this year.

Comparative Statement of Total Pumping During the Past 9 Years.

Date.	Total Yearly Pumping,	Increase or decrease	Average Daily Pumping.	Increase or decrease.	Gallons to each inhabitant daily.
1890	1,638,550,512	112,111,507 incr'se	4,489,178	307,155, increase.	62.35
1891	1,778,056,775	139,506,263 "	4,871,388	382,210, "	64.71
1892	1,961,362,760	183,305,985 "	5,358,914	487,526, "	66.00
1893	2,234,863,924	273,501,164 "	6,122,915	764,001, "	74.50
1894	2,127,878,627	106,985,297 decr'se	5,829,804	293,111, decrease.	69.19
1895	2,190,781,892	62,903,265 incr'se	6,002,142	172,338, increase.	71.65
1896	2,413,506,557	222,724,665 "	6,594,280	592,138, "	75.90
1897	2,441,340,196	27,833,639 "	6,688,603	94,323, "	76.46
1898	2,792,321,110	350,980,914 "	7,650,195	961,592, "	85.69

Comparative Statement of Domestic Pumping During the Past 9 Years.

Year	Temperature Year's Pumping	Increase or Decrease	Average Daily Pumping	Increase or the Decrease	Gallons to each in habitant daily
1898	2 1/2 100 1/2 61 100 200	no rise	1,336 614	197 107	no rise
1899	2 1/2 100 1/2 61 200 612	"	1,400 620	140 102	61 26
1900	2 1/2 100 1/2 61 200 610	"	1,407 620	610 420	61 10
1901	2 1/2 100 1/2 61 200 620	"	1,470 640	67 261	61 61
1902	2 1/2 100 1/2 61 200 607	no rise	1,400 642	120 107	no rise
1903	2 1/2 100 1/2 61 200 601	"	1,392 640	60 76	61 06
1904	2 1/2 100 1/2 61 200 601	no rise	1,387 640	615 100	no rise
1905	2 1/2 100 1/2 61 200 620	"	1,390 642	60 716	61 20
1906	2 1/2 100 1/2 61 200 620	"	1,390 642	60 716	61 20

1. Total water consumed in the	1,372,800
2. Total water consumed in the	11,000
3. Total water pumped	1,383,800
4. Water in Fresh Pond was on May 2, 1906	17 1/2
5. Water in Fresh Pond was on Oct. 10, 1906	15 1/2
6. Height of water in Fresh Pond	10 1/2
7. Water in Stony Brook reservoir was on	82 1/2
8. Water in Stony Brook reservoir was on	7 1/2
9. Water in Hobbs Brook reservoir was on	181 1/2
10. Water in Fresh Pond Pumping Station	12 1/2
11. Water in Stony Brook reservoir	34 00

Total Rainfall for the Last Ten Years.

Month.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
December . .	6.67	3.30	4.40	6.78	1.23	5.23	4.43	1.90	1.63	4.31
January . . .	6.64	2.94	6.68	4.32	1.87	3.05	3.57	2.46	3.32	4.75
February . .	2.81	5.22	4.61	2.46	6.43	2.91	1.07	5.62	2.36	3.61
March . . .	3.29	7.02	5.74	3.56	2.50	.84	2.68	4.37	2.66	2.03
April	3.73	4.83	2.72	.77	3.25	2.94	4.15	1.70	2.82	6.22
May	5.65	6.09	2.44	6.06	7.30	4.63	2.39	2.42	4.24	3.92
June	3.44	3.51	4.01	4.23	2.18	.81	2.76	2.33	5.16	1.82
July	8.53	2.77	3.06	2.53	2.26	2.88	3.28	2.65	4.68	4.56
August . . .	3.78	3.48	3.68	6.11	5.95	1.63	4.71	2.45	5.06	7.34
September . .	5.30	4.05	2.73	1.84	1.76	2.40	1.83	6.29	3.22	1.78
October . . .	3.73	9.31	5.10	2.15	3.77	5.19	10.16	3.10	.55	7.22
November . .	6.51	1.28	3.08	4.04	1.99	3.34	6.09	3.53	6.83	4.92
Total	60.08	53.80	48.25	44.85	40.49	35.85	47.12	38.82	42.53	52.42

Fresh Pond and Surroundings.

The roadway around the pond, the grass borders and the planted section have received the usual care.

The nursery has required more than ordinary care, as a large amount of transplanting has been necessary.

A large part of the standing grass has been sold, as the crop was much beyond the needs of the Department.

The water in the pond has been at the average height of 16.13 feet during the year and has been of remarkably good quality.

Work on the filling and grading of the section on the west side of the pond was begun on October 17th and continued until November 26th, when the weather made further work impracticable.

The buildings are in good condition but should be painted this year.

Pumping Station and Grounds.

All the work in connection with the putting in of the new engine and boilers and the alterations of the buildings made necessary by the same, together with the alterations to the old engines, have been completed.

The Station is now in a very satisfactory condition.

The new engine has been in operation nearly the whole year and its performance has been very satisfactory. There has been no duty trial made as yet to determine the efficiency of the engine or boilers, but we hope to arrange for one early the coming year.

It will be necessary to do some work on the lawn and drive-ways the coming year.

Highland Street Reservoir.

On February 12th the water was shut off from this reservoir and the City supplied through the two sixteen-inch (16 in.) Ross reducing valves in the forty-inch (40-in.) main leading from Payson Park reservoir.

The pressure in the City was increased about fifteen pounds. This has continued to the present and the valves have given perfect satisfaction.

The water in Highland Street reservoir has since been drawn off and the basin cleaned out; it remains so at present.

I would recommend that the connections with this reservoir be cut off and the site disposed of for building purposes.

Payson Park Reservoir.

The whole City has been supplied from this source since February 12th.

The grounds about the reservoir have become a very popular resort for those driving or wheeling on account of the fine view from this point.

From September 19th to 24th the water was drawn off from the south basin for the purpose of cleaning and making an examination of the asphalt bottom. The asphalt was found to be blistered over an area of nearly one-third (1-3) of the bottom, the blisters in some cases being six feet, or more, in diameter.

It is recommended that the basin be underdrained the coming year.

A substantial tool house has been built on the north side of the reservoir.

Pipe Yard.

A considerable improvement has been made at the yard, this year, in the building of a new brick stable. The plans were prepared by Mr. C. Herbert McClary, architect, of Cambridge, and the contract was awarded to Mr. S. J. Kelley, of this City, for the sum of \$10,000. The stable has accommodations for sixteen horses, with wash room, harness room and other conveniences. The building is nearly completed and will be ready for occupancy in the latter part of this month.

The working house has been separated from the shed and the end of the shed covered with corrugated iron as a protection against the weather. The upper part of the house has received some needed repairs and, when painted, will be in good appearance.

The lower part is in need of repairs which should be made during the coming year.

The shed will require some alterations to fit it for storage purposes. When these are completed the yard will be much improved and the workmen will be benefited.

The material stored at the pipe yard a large amount of old material has been stored for years and with no probability of being used. It should have been disposed of years ago. It is recommended that such as, in the judgment of the superintendent, may be disposed of as old material.

Pipe Bridges.

The bridge proposed by the Fitchburg Railroad Company across Massachusetts Avenue, will necessitate some consideration of the water pipes at this point. It is felt that some arrangement should be made to carry the pipes across the bridge, under the sidewalks, so as to bring them to their support in the iron work supporting the sidewalks.

The water main 16 in. pipe line across Beacon Street bridge appeared without damage during the recent storm, about 2000 feet on the southerly side of the bridge.

being carried into the river by the very high tide. The pipe has been raised and very little of it found damaged.

I would recommend that this pipe be removed, as there seems to be no need of it under the changed conditions of the water supply in this section.

Leakage.

Fourteen hundred eight (1,408) leaks have been reported and investigated.

Fifteen (15) have been stopped on iron main pipe, as follows: Five (5) on 4-inch, seven (7) on 6-inch, one (1) on 8-inch, one (1) on 12-inch and one (1) on 20-inch.

Twelve hundred seventy (1,270) have been reported on pipes and fixtures on premises; these have been repaired by the occupants or owners.

One hundred twenty-three (123) on supplies in streets have been repaired by the Department.

Of the total number of leaks stated above, twelve hundred sixty (1,260) were reported by the inspectors as the result of the annual canvas; they were distributed as follows: Three hundred fifty-one (351) on faucets, eight hundred thirty-five (835) on water closets and seventy-four (74) on pipes.

Table Showing a Gain or Loss in Total Consumption for the Year 1898 over the year 1897.

	Total Consumption 1898.	Total Consumption 1897.	Increase or Decrease x or —
December,	210,803,340	216,367,481	— 5,564,141
January,	235,138,540	222,050,830	x 13,087,710
February,	221,925,900	190,232,540	x 31,693,360
March,	228,800,475	202,428,145	x 26,372,330
April,	212,361,600	197,402,585	x 14,959,015
May,	215,073,060	191,350,040	x 23,723,020
June,	241,610,160	195,727,510	x 45,882,650
July,	250,865,560	215,121,905	x 35,743,655
August,	265,579,600	210,523,365	x 55,056,235
September,	229,313,920	208,745,405	x 20,568,515
October,	260,146,275	209,623,410	x 50,522,865
November,	220,702,680	181,766,980	x 38,935,700
Total . .	2,792,321,110	2,441,340,196	x 350,980,914

Main Pipe.

Main pipes have been laid in the following streets: 1,400½ feet of 6 inch in Aston Street, from Pearl Street to Waverly Street; 714 feet of 6 inch removed, 714 feet of 6 inch in Amory Street, from Summer Street to Hampshire Street, in place of 4 inch removed; 1,200 feet of 6 inch in Antrim Street, from Cambridge Street north, in place of 4 inch removed; 1,36½ feet of 6 inch in Appleton Place; 845 feet of 6 inch in Arlington Street, from Massachusetts Avenue to Walnut Avenue, in place of 4 inch removed; 105 feet of 6 inch in Bancroft Street, from Walnut Avenue; 415 feet of 6 inch in Beaver Street, from Massachusetts Street to Flagg Street, in place of 4 inch removed; 62 feet of 6 inch in Binney Street, east and west from Flagg Street; 149 feet of 6 inch in Boardman Street, from Flagg Street to Broadway, in place of 4 inch removed; 826½ feet of 6 inch in Bond Street, from Massachusetts Avenue to London Street; 124 feet of 4 inch removed, 210 feet of 1½ inch in Boyle Street, from Mt. Auburn Street; 34 feet of 6 inch in Brady Street; 315 feet of 6 inch in Brown Street, from Foster Street to Foster Street, in place of 4 inch removed, 81 feet of 6 inch in Bunker Avenue Park; 662 feet of 6 inch in Centre Street, from Bond Street to Hancock Street, in place of 4 inch removed; 100 feet of 6 inch in Clark Street, from School Street to School Street, in place of 4 inch removed, and 1,307 feet of 6 inch in Washington Street to Webster Avenue, in place of 4 inch removed; 268 feet of 6 inch in Clement Circle, from School Street east; 600 feet of 6 inch in Comptrolwaite Street, from Bond Street to 14 Wolf Street, in place of 4 inch removed; 200 feet of 4 inch in Cranland Street, from Bristol Street to Clark Street, in place of 4 inch removed; 1,171 feet of 6 inch in 14 Wolf Street, from Flagg Street to Mt. Auburn Street; 124 feet of 4 inch removed, 273 feet of 6 inch in Deigo Street, from George Street to Western Avenue, in place of 4 inch removed; 2,285 feet of 6 inch in Elm Street, from Cambridge Street to Harvard Street, in place of 4 inch, and 1 inch removed; 107 feet of 6 inch in Elmwood Street; 2,144 feet of 6 inch in the Esplanade of the Park Department; 35 feet of 6 inch in Everett Street, from Massachusetts Avenue

east, in place of 12-inch removed; 1,358 feet of 6-inch in Fayette Street, from Broadway to Cambridge Street, in place of 4-inch removed; 162 feet of 6-inch in Felton Street, from Broadway north; 649 feet of 6-inch in Flagg Street, from De Wolf Street to Putnam Avenue, in place of 4-inch removed; 13 feet of 6-inch in Foster Street, from Lowell Street east; 791½ feet of 6-inch in Frost Street, from Harris Street to Roseland Street, in place of 4-inch removed; 22 feet of 6-inch in Garden Street, connecting Concord Avenue, and 10 feet of 6-inch connecting Mason Street; 413 feet of 6-inch in Gerry Street, from Mt. Auburn Street, in place of 3-inch removed, and 157½ feet of 6-inch, extension; 603 feet of 6-inch in Grant Street, from Banks Street to DeWolf Street, in place of 4-inch removed; 12 feet of 6-inch in Gray Street, from Martin Street; 495 feet of 6-inch in Hamilton Street, from Brookline Street to Pearl Street in place of 4-inch removed; 389 feet of 6-inch in Hancock Street, from Centre Street to Harvard Street, in place of 4-inch removed; 19 feet of 6-inch in Harris Street, from Frost Street; 71 feet of 6-inch in Harrison Street, from School Street north; 34 feet of 4-inch in Holly Street, from Brooks Street to Clark Street, in place of 1½-inch removed, and 183 feet of 4-inch, extension; 305 feet of 6-inch in Hudson Street, from Bowdoin Street to Hudson Place; 97 feet of 4-inch in Inman Place, from Jones' Alley west; 27 feet of 6-inch and 170 feet of 4-inch in Irving Terrace, from Sumner Street east; 20½ feet of 4-inch in Jones' Alley; 177½ feet of 4-inch in King Street, from Walden Street; 244 feet of 4-inch in Kirkland Road, from Kirkland Street; 194 feet of 6-inch in Lafayette Square, in place of 4-inch removed; 97½ feet of 2-inch in Lincoln Place; 578 feet of 6-inch in Lincoln Street, from Elm Street to Winsor Street, in place of 3-inch and 4-inch removed, and 204 feet of 6-inch from Webster Avenue to Willow Street; 471 feet of 6-inch in Lopez Street, from Brookline Street to Pearl Street, in place of 4-inch removed; 896 feet of 6-inch in Lowell Street, from Brattle Street to Mt. Auburn Street, in place of 4-inch removed; 27 feet of 6-inch in Madison Street, connecting Concord Avenue; 250 feet of 6-inch in Market Street, from Clark Street to Bristol Street (extension), and 932 feet of 6-inch from Elm Street to

1. 12 inch and 1 inch removed, 512 feet
 Main Street, from Avon Street to Bowdoin Street,
 1,240 feet of 20 inch in Massachusetts
 Street to Holmes Place, in place of
 12 inch at Everett Street, 207
 Ward 5, from Roseland Street
 1 inch in Oxford Street Ward 2, from
 1 inch in Park Avenue, 255 feet of
 Street from Main Street south, 161 feet of
 1 inch in Prospect, 178 feet of 6 inch in Pros-
 1 inch in North, 1,204 feet of 6 inch in
 1 inch in Street, 78 feet of 6 inch in Ros-
 1 inch in Street west, and 204 feet of 6 inch
 1 inch removed, 14 feet of 6 inch
 1 inch in Water Street, 214 feet of 6 inch in
 1 inch in Avon Street to Pine Street, in place of
 1 inch from Clark Street to
 1 inch removed, 214 feet of 6 inch
 1 inch in Cambridge Street to Core Street, in place
 1 inch in Sheridan Street, from
 1 inch in Spring Street, to 1 inch
 1 inch in Suffolk Street, from 1 inch
 1 inch in place of 1 inch removed, 614 feet
 1 inch from Cambridge Street to Kirkland
 1 inch removed, 120 feet of 6 inch in Union
 1 inch in Street to Market Street, in place of
 1 inch in Avenue Street from
 1 inch in Avenue Street from
 1 inch in State Street, in place of 1 inch to
 1 inch in Avenue Street extended, 11
 1 inch in Water Street, from Harvard Street, in place of
 1 inch in Water Street, from
 1 inch in Pine Street, in place of 1 inch removed,
 1 inch in Water Street, from Lincoln Street to
 1 inch from 1 inch, from Lincoln Street to Pal-
 1 inch in Water Street, from Sheridan
 1 inch in Water Street, from 1 inch in Worcester Street,
 1 inch in Street to Norfolk Street, in place of 1 inch re-

moved; 513 feet of 6-inch in York Street, from Berkshire Street to Webster Avenue.

Total length of cast iron pipes laid during the year is 36,135 feet, or 6.8437 miles; renewals, 4.81 miles; extensions, 2.0337 miles; the weight of the metal was 596.98 tons.

The sizes of cast iron pipe laid during the year, their lengths and weights, are as follows:—

Size.	Length in Feet.	Weight in Tons.
20 inches	1,249	108.17
12 inches	49	1.90
6 inches	32,982½	471.18
4 inches	1,854½	15.73

In the two locations in Binney Street the eight-inch (8-in.) pipe has been offset, and in Hampshire Street the six-inch (6-in.) pipe has been offset for the accommodation of the Cambridge Gas Light Company.

At Massachusetts Avenue, corner of Albany Street, the twelve-inch (12-in.) pipe has been offset that the Sewer Department might have the customary location for its pipe.

In Inman Street, at Austin Street, the old three-inch (3-in.) main pipe has been capped. The Telephone Company required the location occupied by this pipe, which was abandoned in 1872 when the new twelve-inch (12-in.) was laid.

The six-inch (6-in.) main in Aberdeen Avenue has been raised.

The two-inch (2-in.) main in New Street has been relocated.

Supplies.

Two hundred twenty-eight (228) new supplies have been laid during the year.

Thirteen thousand, seven hundred forty-one (13,741) supplies have been laid to date, November 30, 1898.

Five hundred seventy-six (576) supplies have been renewed; of these, thirty-three (33) were enlarged.

Two (2) supplies have been extended.

Sixty-one (61) supplies have been furnished with sidewalk shut-off boxes.

When laying the new and enlarged main pipes, the supply

pipes were renewed where necessary, and, where requested by the owners of the property, extended on the premises, the owners paying the expense of such extension.

In many cases, included above, the supply pipes have been changed, the owners of the property bearing the cost of the additional expense in the street and the total cost on the premises. There have been fifty-four (54) supplies renewed under these contracts as follows: Five (5) in Allston Street, one (1) in Amory Street, thirteen (13) in Amory Street, twelve (12) in Argyle Street, five (5) in Banks Street, seven (7) in Beaver Street, four (4) in Boardman Street, five (5) in Bow Street, eight (8) in Brown Street, ten (10) in Centre Street, twenty-two (22) in Clark Street, nineteen (19) in Cowperthwaite Street, eight (8) in Cranland Street, eleven (11) in DeW. f Street, eleven (11) in Dodge Street, forty-nine (49) in Elm Street, seven (7) in Fayette Street, nineteen (19) in Flag Street, four (4) in Frost Street, eleven (11) in Gerry Street, eighteen (18) in Grant Street, seventeen (17) in Hamilton Street, ten (10) in Hancock Street, two (2) in Holly Street, two (2) in Hull Street, two (2) in Irving Terrace, two (2) in Lee Street, five (5) in Lincoln Street, twenty-three (23) in Lopez Street, six (6) in Lowell Street, one (1) in Lafayette Square, twenty-three (23) in Market Street, three (3) in Martin Street, six (6) in Massachusetts Avenue, two (2) in Roseland Street, seven (7) in School Street, seven (7) in School Street, seventeen (17) in School Street, six (6) in Summer Street, fifteen (15) in Union Street, eight (8) in Village Street, twelve (12) in Watson Street, and eleven (11) in Worcester Street.

In Essex, Hampshire, Plymouth and Portland Streets, and Worcester Avenue, the supplies have been changed for the Cambridge Gas Light Company, the cost of this work, as well as the expenses attending the changes in the main pipes in Faneuil and Hampshire Streets, have been paid for by the company.

In order to get through on the location of the sewer at No. 10 Main Street and in New Street, the supplies have been changed.

On the premises of Harvard College on Kirkland Street in Cambridge the supplies have been changed.

The original supply for Gregory Heirs on Boylston Street has been removed.

Supplies for J. M. Woods, Bridge Street, have been shut off at the main and abandoned. Commercial Avenue is to be built on this site.

The four-inch (4-in.) fire supply for the New York Biscuit Company on Franklin Street has been connected to the main in street.

At the opening of the season the service boxes in all parts of the city were examined and lowered in places where they had been raised by the action of the frost.

Where the grades of the streets have been changed the service boxes have received attention, as follows: In Berkshire and Hardwick Streets they have been raised, and in Buena Vista Park, Eaton Street and Ellsworth Avenue, lowered.

Fountains.

One ice water drinking fountain of Jenks' make has been set at the corner of Massachusetts Avenue and Blake Street.

There are now four (4) in use.

One drinking fountain of Jenks' make has been set in Wyeth Square.

There are twenty-four (24) drinking fountains in use.

Total number of drinking fountains in use in the City, twenty-eight (28).

Supply for fountain in Fresh Pond Drive, near Holworthy Street gate house, has been renewed.

The drinking fountains located as follows have received necessary repairs. Broadway and Norfolk Streets, Cambridge and Third Streets, Central Square, Lechmere Square, Rindge Avenue, Winsor Street.

Street Watering Standpipes.

There has been no addition during the year to the number of street watering standpipes.

The standpipe at the corner of Sherman and Walden Streets has been reset; it is now located on Walden Street about sixty (60) feet from Sherman Street.

At the opening of the season the standpipes received their

and in inspection and were furnished, where needed, with new valves.

In cases where the valves were injured by frost after the water had been put in thorough running order by the Water Board, and the expense of the repairs and new valves was met by the Street Department.

Gates.

During the year thirty-two (32) gates have been set, as follows: one (1) 12 inch, thirty six (36) 4 inch, ninety two (92) 6 inch, one (1) 10 inch, one (1) 12 inch and one (1) 20 inch.

At the corner of Third and Charles Streets, in Harris Street, at the intersection of Street, new 4 inch gates have been set in place of the old ones.

At the corner of Fairmount and Pleasant Streets, a broken 6 inch gate has been replaced by a new one.

In Mt. Auburn Street, corner of Lowell Street, the defective 6 inch gate has been removed, a new one has been set.

A 6 inch gate in Columbia Street has been repaired.

The gates in all parts of the City have been inspected and the defective ones repaired.

Boxes.

During the year twelve (12) iron gate boxes have been set on openings at external work, twelve (12) iron gate boxes on openings at internal work, in place of old ones. One (1) 12 inch, eight (8) 10 inch, eight (8) small and five (5) large wooden boxes and three (3) hydrant boxes have been set.

A new brick vault or gate box was built at the corner of Dana Street and Elm Street for the new 20 inch gate.

The number of boxes set, one hundred and sixty five (165).

On account of the changes in the grades of the streets following the rains have been raised or lowered, the gates in Fayette Street at Main Street at First Street, and Bridge Avenue at Hollis Street the gate boxes have been lowered, in Cambridge Street at Elm Street, in Dana Street, in Harvard Street at Dana Street, in Johnson Street at Avon Street, in Mt. Auburn Street at Forest Street, in Railroad Company's, in Massachusetts Avenue at Webster Street, and in River Street, the gate boxes have been raised.

Check Valves.

In the following streets the check valves have been removed: Arlington Street (6-inch), Bigelow Street (6-inch), Clinton Street 6-inch), Highland Avenue (6-inch), Lee Street (4-inch), Massachusetts Avenue at Pleasant Street (8-inch), and Massachusetts Avenue at Prospect Street, (10-inch).

The clapper of 4-inch check valve in Linden Street has been removed.

Meters.

There are four hundred forty-seven (447) meters set in the City.

Ball and Fitts	5
Buffalo	1
Crown	45
Desper	1
Empire	2
Frost	3
Gem	1
Hersey	92
Nash	9
Thomson	8
Trident	59
Union Duplex	1
Union Rotary	61
Worthington	158
Weir	1
	<hr/>
	447

The meters on the premises of John Quinn, Otis Street, and Chelmsford Foundry Company, on Portland Street, have been moved from the inside to the outside of the property.

Boston Woven Hose and Rubber Company has had its meter relocated (the 6-inch supply having been extended); and the meter at the Cambridge Electric Light Company's has been reset.

Hydrants.

Sixteen (16) hydrants have been added to the list this year.

Post hydrants have been set as follows: In Allston Street, corner of Brookline Street, Coffin; in Arlington Street, corner of Massachusetts Avenue, Coffin; in Appleton Street, corner of

David Avenue, Perkins; in Binney Street, corner of Fifth Street, Coffin; in Broadway, corner of Jordan Place, Coffin; in Leonard Street, corner of Broadway, Coffin; in Banks Street, corner of Grant Street, Coffin; in Centre Street, near Davis Street, Coffin; in Congerthwaite Street, corner of De Wolf Street, Coffin; in Clark Street, corner of Dickinson Street, Coffin; in Concord Avenue, near Buckingham Street, Perkins; in Leonard Street, corner of Massachusetts Avenue, Chapman; in Concord Avenue, near Craigie Street, Holyoke; in Everett Street, near Massachusetts Avenue, Coffin; in Fayette Street, near North Street, Coffin; in Front Street, near Roseland Street, Chapman; in Garden Street, at Walden Street, Coffin; in Glenwood Street, at Magazine Street, Coffin; in Grant Street, at De Wolf Street, Coffin; in Hamilton Street, at Brookline Street, Coffin; in Lowell Street, at Foster Street, Coffin; in Massachusetts Avenue, opposite Waterhouse Street, Coffin; in Massachusetts Avenue, at Jarvis Street, Coffin; in Mt. Auburn Street, at Sparks Street, Coffin; in Market Street, corner Elm Street, Coffin; in Market Street, near Union Street, Coffin; in Portland Street, near Main Street, Coffin; in Bridge Avenue, west from Clifton Street, Coffin; in River Street, opposite Fairmont Street, Perkins; in Sumner Street, near Irving Terrace, Coffin; in Union Street, opposite Wood Street, Coffin; in Suffolk Street, near East Street, Coffin; in Willow Street, near Lincoln Street, Coffin; in Worcester Street, near Columbia Street, Coffin.

Total number of post hydrants set, thirty-five (35), as follows: Twenty (20) Chapman, twenty-nine (29) Coffin, one (1) Holyoke and none (0) Perkins.

Flush hydrants have been set as follows: In Davis Street, corner of Broadway, and in Massachusetts Avenue, opposite Jackson Street.

Total number of flush hydrants set, two (2).

Total number of hydrants post and flush set, thirty-seven (37).

Post hydrants have been removed, as follows: In Ash Street, now used by the City for park purposes, Chapman. In Buckingham Street, near Concord Avenue, Perkins. In Dunbar Street, corner of Massachusetts Avenue, Perkins. In Mt.

Auburn Street, near Sparks Street, Perkins; and in River Street, opposite Fairmont Street, Holyoke.

Total number of post hydrants removed, five (5), as follows: One (1) Chapman, one (1) Holyoke and three (3) Perkins.

Flush hydrants have been removed, as follows: In Brookline Street, corner of Allston Street; in Brookline Street, corner of Hamilton Street; in Broadway, corner of Boardman Street; in Banks Street, corner of Grant Street; in Centre Street, corner of Dana Street; in Concord Avenue, opposite Craigie Street; in Davis Street, corner of Broadway; in Frost Street, corner of Roseland Street; in Grant Street, corner of DeWolf Street; in Massachusetts Avenue, at Arlington Street; in Massachusetts Avenue, corner of Jarvis Street; in Massachusetts Avenue, opposite Tannery Street; in Market Street, corner of Elm Street; in Market Street, corner of Union Street; in Otter Street, corner of DeWolf Street; and in School Street, corner of Clark Street.

Total number of flush hydrants removed, sixteen (16).

Total number of hydrants (post and flush) removed, twenty-one (21).

Total number of hydrants in Cambridge, nine hundred twenty-two (922); of these, ten (10) Chapman in Potter Street and two (2) Chapman in Binney Street are the property of the American Rubber Company.

Below find styles and number.

Boston	158
Chapman	401
Coffin	40
Flush	143
Holyoke	88
Perkins	92

922

Two post hydrants have been broken by teams. One (Chapman) has required a new frost case, etc., only; and one (Perkins), at the corner of Mt. Auburn and Sparks Streets, has been replaced by a new Coffin.

Defective hydrants, as follows, have been repaired in their locations at corner of Cambridge and Eighth Streets, Cambridge

and Third Streets, Harvard and Bigelow Streets, Main and Portsmouth Streets, Massachusetts Avenue and Frank Street, Massachusetts Avenue and Chester Street, Massachusetts Avenue and Lancaster Street, Elm Street, and Sparks Street.

On account of change of grade of streets or curbstones, the following have been reset in Banks Street, in Cambridge Street at Hulse Place, in Cambridge Street at Felton Street, in Lincoln Street at Massachusetts Avenue, and Reservoir Street at Highland Street.

There have been laid and the wastes of the hydrants, following connected to the sewers: Hancock and Harvard Streets, Massachusetts and Lancaster Streets, and Huron Avenue and Third Street.

Stony Brook

A concrete work point about the gate house and overflow has been pointed with Portland cement.

It is necessary the coming year to build several hundred feet of concrete near the upper end of the reservoir on the gate house to prevent earth from getting to the basin.

Table showing the Daily Average Number of Gallons, by the Month, Flowing Over the Waste Way at Stony Brook.

	Gallons	No. of Days		Gallons	No. of Days
Jan. 1898	1,477,412	31	June 1898	2,000,000	30
Feb. 1898	1,200,000	28	July 1898	2,000,000	31
Mar. 1898	1,100,000	31	Aug. 1898	1,000,000	31
Apr. 1898	1,000,000	30	Sept. 1898	1,000,000	30
May 1898	1,000,000	31	Oct. 1898	1,000,000	31
June 1898	1,000,000	30	Nov. 1898	1,000,000	30

Total gallons wasted

12,000,000 gallons

Total number of days in which water wasted

365

Stony Brook Pipe Line

The pipe line has been examined as usual and all air valves are in good repair as needed. The discharge from this main would be increasing more rapidly than it should and as there are several depressions in the line where an accumulation could

take place, and in view of the fact that the screens in the gate house have been broken and a large amount of leaves, etc., carried into the pipe, I would recommend that an internal examination of this line be made this year by cutting in at different points with the A. P. Smith tapping machine and putting on manhole covers.

Hebbs Brook.

The land along the borders of the basin between Lexington Street and Winter Street dam has been graded and part of it seeded down.

The land along Winter Street has been partly graded and a low place near the new road has been filled.

Nineteen hundred (1,900) feet of fence extending from the Winter Street dam along Winter Street to the land of A. J. Merrill has been built.

The overflow from the Winter Street dam has been carried to the brook below the dam.

A large amount of dead wood has been cut around the basin and the premises much improved.

I would recommend that the coming year, should the conditions be favorable, the meadows above the old ice house be ditched and the water courses cleaned out.

RECAPITULATION.

New Supplies.

Main Pipe.

	2 ¹ / ₂ "	3 ¹ / ₂ "	4 ¹ / ₂ "	6 ¹ / ₂ "	8 ¹ / ₂ "	10 ¹ / ₂ "	Total
Length in feet of new pipe extensions	-	-	500	400	200	100	1200
Length in feet of new pipe renewals	100	200	300	400	-	-	1000
Total length in feet of new pipe	100	200	800	800	200	100	2400
Number of joints	1	1	20	20	-	-	42
Number of bed-joints	-	-	-	-	-	-	0

Comparative Trenching for the Past 9 Years.

	Excavations	Reinforcements	Supplies	Total Feet	Miles
1900	11,712 1/2	1,970	15,325	29,007 1/2	5.52
1901	9,620 1/2	2,120	17,050	28,790 1/2	5.41
1902	14,700 1/2	17,020	10,015	41,735 1/2	8.79
1903	10,200 1/2	11,000 1/2	10,223 1/2	31,423 1/2	6.31
1904	11,475	17,601 1/2	17,311	46,387 1/2	9.16
1905	11,000	15,620 1/2	22,300	49,920 1/2	9.37
1906	17,621	26,261	17,301	61,183	11.55
1907	1,500	20,000 1/2	10,121 1/2	31,621 1/2	12.19
1908	11,000 1/2	21,207	12,100	44,307 1/2	9.21

Conclusion.

Following will be found the Engineer's report.

All of which is respectfully submitted.

E. C. BROOKS,

Superintendent.

REPORT

OF THE

PUMPING ENGINEER.

DECEMBER 1st, 1898.

To the Honorable the Water Board of the City of Cambridge:

Gentlemen:—From May 1st, the date of my appointment as chief engineer at the pumping station, the new twenty million gallon Leavitt pumping engine was run at intervals, as repairs on the pumping station would permit, until June 1st, when the engine was put to regular work and has run very satisfactorily to this date, with no trouble whatever.

Nos. 1 and 2 Worthington engines and No. 4 Blake engine are in first class condition, ready to run in one hour's notice if anything should happen to No. 7.

The new electric light plant was started May 12th, running daily since that date, doing all that was expected of it.

The steam pipe in the engine room for engines Nos. 1 and 2 has been covered with black walnut lagging; this completes all the new work in the main engine room.

The electric device for showing height of water at the reservoir has arrived at the station and will be put in operation soon.

Aside from piping up the pump and receiver, which I understand is ordered, and making a few changes on piping in the fire room for the testing engine and boilers, the plant is complete and in first-class condition.

Respectfully submitted,

E. I. HARRIS,
Engineer.

**Engineered by the
Ford Motor Co. and
Packard Motor Co.**

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030																																																		
Population	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355	360	365	370	375	380	385	390	395	400	405	410	415	420	425	430	435	440	445	450	455	460	465	470	475	480	485	490	495	500	505	510	515	520	525	530	535	540	545	550	555	560	565	570	575	580	585	590	595	600	605	610	615	620	625	630	635	640	645	650	655	660	665	670	675	680	685	690	695	700	705	710	715	720	725	730	735	740	745	750	755	760	765	770	775	780	785	790	795	800	805	810	815	820	825	830	835	840	845	850	855	860	865	870	875	880	885	890	895	900	905	910	915	920	925	930	935	940	945	950	955	960	965	970	975	980	985	990	995	1000

REPORT

OF THE

TRUSTEES OF THE SINKING FUND OF THE CAMBRIDGE WATER WORKS.

To the Honorable the City Council:

The undersigned, Trustees of the Sinking Fund of the Water Works, herewith submit their annual report of the fund committed by law to their charge. The report covers the year ending November 30, 1898.

Dr.

Amount of the fund Nov. 30, 1897	\$464,138.28	
Received during the year as follows:		
From the Treasurer of the City of Cambridge the annual required ap- propriation from the water rates	103,656.00	
From interest on investments	10,153.53	
	<hr/>	\$577,947.81

Cr.

Amount paid City Treasurer to meet maturing bonds	\$12,500.00	
Amount paid for interest on invest- ments purchased	1,897.03	
Amount paid for premium on invest- ments purchased	18,154.00	
Less the amount of the "Contingent Loan Obligation" of the City of Cambridge heretofore reckoned in the assets, now not included as an interest bearing asset	200,000.00	
Leaving the interest bearing amount of the fund November 30, 1898	345,396.78	
	<hr/>	\$577,947.81

The following are the investments belonging to the funds.

London & Lancashire Co. maturing Dec. 1, 1915	\$2,000.00
London & Lancashire Co. maturing Dec. 1, 1916	5,000.00
London & Lancashire Co. maturing Dec. 1, 1917	10,000.00
London & Lancashire Co. maturing Nov. 1, 1920	5,000.00
	\$112,100.00
London & Lancashire Co. maturing July 1, 1900	\$11,000.00
London & Lancashire Co. maturing April 1, 1900	1,000.00
London & Lancashire Co. maturing Dec. 1, 1900	1,000.00
London & Lancashire Co. maturing Dec. 1, 1901	50,000.00
London & Lancashire Co. maturing Dec. 1, 1902	5,000.00
London & Lancashire Co. maturing Aug. 1, 1903	10,000.00
London & Lancashire Co. maturing July 1, 1910	8,000.00
London & Lancashire Co. maturing March 1, 1917	2,000.00
London & Lancashire Co. maturing April 1, 1917	24,000.00
London & Lancashire Co. maturing Jan. 1, 1918	15,000.00
London & Lancashire Co. maturing March 1, 1918	1,000.00
London & Lancashire Co. maturing Aug. 1, 1920	25,000.00
London & Lancashire Co. maturing May 1, 1921	2,000.00
London & Lancashire Co. maturing May 1, 1922	1,000.00
London & Lancashire Co. maturing May 1, 1923	2,000.00
London & Lancashire Co. maturing May 1, 1924	1,000.00
London & Lancashire Co. maturing May 1, 1925	1,000.00
London & Lancashire Co. maturing July 1, 1927	10,000.00
London & Lancashire Co. maturing May 1, 1928	1,000.00
London & Lancashire Co. maturing June 1, 1928	5,000.00
London & Lancashire Co. maturing May 1, 1929	1,000.00
London & Lancashire Co. maturing May 1, 1930	1,000.00
London & Lancashire Co. maturing May 1, 1931	1,000.00
London & Lancashire Co. maturing May 1, 1932	1,000.00
London & Lancashire Co. maturing Aug. 1, 1933	2,000.00
London & Lancashire Co. maturing June 1, 1934	11,000.00
London & Lancashire Co. maturing Jan. 1, 1935	25,000.00
	2,000.00
	\$145,100.00
London & Lancashire Co. maturing Nov. 1, 1935	200.75
	\$145,300.75
London & Lancashire Co. maturing Nov. 1, 1935	\$200.00

The bonded water debt, which the foregoing fund is to pay, matures as follows, viz:—

November 1, 1906, three and one-half per cent	43,000.00
October 1, 1907, four per cent	90,000.00
November 1, 1907, four per cent	22,000.00
July 1, 1908, four per cent	46,000.00
August 1, 1908, four per cent	25,000.00
July 1, 1909, four per cent	20,000.00
May 1, 1910, four per cent	288,000.00
July 1, 1910, four per cent	75,000.00
September 1, 1910, four per cent	125,000.00
January 1, 1911, four per cent	20,000.00
October 1, 1911, four per cent	35,000.00
January 1, 1912, four per cent	150,000.00
May 2, 1912, four per cent	75,000.00
November 1, 1912, four per cent	45,000.00
February 1, 1913,	100,000.00
August 1, 1913,	50,000.00
April 1, 1915,	200,000.00
August 1, 1915, four per cent	200,000.00
April 1, 1916	100,000.00
July 1, 1916, four per cent	200,000.00
August 1, 1916, four per cent	100,000.00
October 1, 1916, four per cent	265,100.00
April 1, 1917, three f per cent	200,000.00
July 1, 1917, three one- per cent	100,000.00
November 1, 1917, three and one-half per cent	75,000.00
December 1, 1917, three and one-half per cent	40,000.00
December 1, 1917, three and one-half per cent	100,000.00
May 2, 1918, three and one-half per cent	50,000.00
June 1, 1918, three and one-half per cent	60,000.00
November 1, 1918, three and one-half per cent	50,000.00
April 1, 1924, four per cent	300,000.00
	<hr/>
	\$3,240,100.00

In making the foregoing report a word of reminder and explanation may be necessary. The City Council will remember that no appropriation was made in the annual budget for any interest on the "Contingent loan obligation" for \$200,000.00 which for fifteen years has been enumerated among the assets of the fund and consequently no interest has been received by the Trustees of this obligation. While this obligation is still held among the possessions of the fund, we have felt that it was wise to refrain from enumerating it among the live assets held for the payment of the bonded water debt in view of the opinion of the City Solicitor given to the Mayor and City Council of our City, that "said obligation" is not a legal and valid obligation of the City.

We note with regret that for the first time in a number of years nothing has been received under the head of "surplus receipts."

We would respectfully call the attention of the City Council to the advisability of making an amendment to the Legislative Act of 1905 whereby these funds may be put into the charge of the Board of Commissioners of the Sinking Fund of the City rather than to remain in charge of an ex officio board, a majority of the members of which may be changed at any time.

ALVIN F. SORTWELL,

GEORGE F. SANDERS,

WILLIAM W. DALLINGER,

Trustees of the Sinking Fund of the Cambridge Water Works.

City of Cambridge

ANNUAL REPORT

March 1907

Cambridge Water Board

PRINTED FOR THE DEPARTMENT

City of Cambridge

ANNUAL REPORT

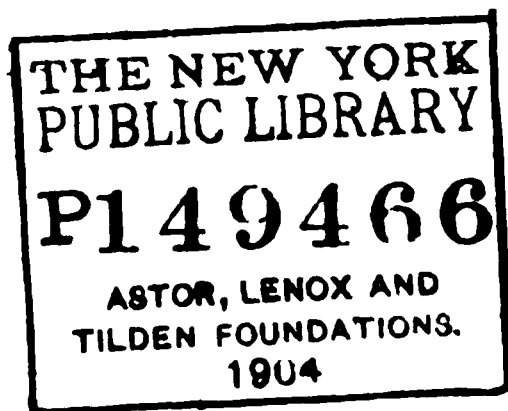
OF

THE WATER BOARD

FOR THE

YEAR ENDING, NOVEMBER 30, 1890

PRINTED FOR THE DEPARTMENT



BOSTON:
J. A. CUMMINGS PRINTING CO
1900

CAMBRIDGE WATER BOARD

1900

President.

WILLIAM B. DURANT

Members of the Board.

•	W. H. HOWARD	Term expires 1901
•	W. B. DURANT	Term expires 1901
•	W. B. KELLEY	Term expires 1902
•	NATHAN FLEMING	Term expires 1903
•	N. C. STEVENS	Term expires 1904

WALTER H. HARDING, Clerk

Superintendent of Works.

EDWIN C. BROOKS

Water Registrar.

WALTER H. HARDING.

Trustees of Sinking Fund of Water Loan.

• CITY TREASURER AND PRESIDENT OF THE
COMMON COUNCIL

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-99.

CHESTER W. KINGSLEY . . .	1865-1894	
JOHN SARGENT	1865-1871	
A. K. P. WELCH	1865-1871	
ROBERT DOUGLASS	1865-1871	
SAMUEL SLOCOMB	1865-1876	
Z. L. RAYMOND	1871	
HENRY L. EUSTIS	1871-1885	
J. WARREN MERRILL	1871-1881	
GEORGE P. CARTER	1871-1883	
JOHN H. LEIGHTON	1876-1879	
KNOWLTON S. CHAFFEE	1879-1889	
JAMES M. W. HALL	1881-1899	
LEANDER M. HANNUM	(1883-1884 1885-1893	
JOHN F. O'BRIEN	1884-1895	
GEORGE H. HOWARD	1889-	(Now in Office.)
E. BURT PHILLIPS	1893-1896	
STILLMAN F. KELLEY	1894-	(Now in Office.)
FRANK A. ALLEN	1895-1899	
WELLINGTON FILLMORE	1896-	(Now in Office.)
EDMUND H. STEVENS	1899-	(Now in Office.)
WILLIAM B. DURANT	1899-	(Now in Office.)

Presidents of the Board.

J. WARREN MERRILL	1865-1867
EZRA PARMENTER	1867
JOHN SARGENT	1867-1871
J. WARREN MERRILL	1871-1873
CHESTER W. KINGSLEY	1873-1876
GEORGE P. CARTER	1876-1883
CHESTER W. KINGSLEY	1883-1894
JAMES M. W. HALL	1894-1899
WILLIAM B. DURANT	1899-

REPORT OF THE CAMBRIDGE WATER BOARD

Cambridge, December 14, 1899

Very respectfully submitted to the City Council

The annual report of the Cambridge Water Board for the year ending November 30, 1899, is herewith submitted for your consideration.

The different water basins and the amount and quality of water supply were so fully considered in the last annual report that it is unnecessary to say that no essential change has taken place. The efforts of the Board having been mainly confined to the purification of the water and the maintenance of the works and equipment established. The year has been marked by the adoption of a plan to protect the purity of the water, and the establishment of a new water supply.

The most important event of the year has been the adoption of the State Board of Health's plan for the Metropolitan and Cambridge Water Supply, which is now being carried out. The plan is a continuation of the plan adopted by the State Board of Health in 1897, and is based on the principle of the purity of the water. The plan is based on the principle of the purity of the water, and is based on the principle of the purity of the water. The plan is based on the principle of the purity of the water, and is based on the principle of the purity of the water. The plan is based on the principle of the purity of the water, and is based on the principle of the purity of the water.

The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health. The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health. The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health.

The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health. The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health. The Water Board has been very anxious to secure the public health, and has been very anxious to secure the public health.

of Lincoln taking the ground that a prior right in the brook was held by Mr. Sargent, and that it was better for our city to purchase the place than to invoke its aid in a case where its power might be questioned. We are glad to be able to say that this menace no longer exists, and that the most dangerous place on our whole water system is now free from all possible pollution.

We desire to express our gratitude to the town authorities of Lincoln for refusing another license to the former owner, on account of the bad record of his former establishment for uncleanness, and for saving thereby our supply from the pollution which might come from another slaughter-house located near the brook. The local Boards of Health of Lincoln and Waltham have heartily co-operated with us in assisting to protect our Hobbs Brook system from pollution, and we are glad to express our appreciation of their successful efforts in that behalf.

We have also recently taken about eight acres of land belonging to Reuben Wyman, bordering on Hobbs Brook, immediately below and south of the Winter Street dam. This land was used for grazing and pasturage of cattle and swine, and necessarily would soon become a source of pollution. We trust that no more takings or purchases of land will be necessary, at least for a long time to come.

An important event of the year was the passage of an ordinance by the City Council prohibiting skating on Fresh Pond. Recent discoveries in bacteriology demonstrate fully the necessity of this action, and it is hoped that the people will appreciate the fact that the health of the great majority of the inhabitants is of far more importance than the amusement of the small minority who have heretofore been accustomed to skate upon the pond. Skating facilities can doubtless be provided elsewhere, as they are in other neighboring cities, where reservoirs of water used for drinking purposes are not used for skating. We are glad to be informed that the subject will receive the attention of the City Council, acting through the proper department.

FINANCIAL STATEMENT IN BRIEF.

The total cost of the Water Works to November 30, 1898, was	\$5,602,364 56
There was expended during the past year on Construction account	46,651 09
Making the total cost to November 30, 1899	<u>\$5,649,015 65</u>

WATER BOND ACCOUNT.

The whole amount of bonds outstanding is	\$3,272,100 00
From this is to be deducted the present value of the Water Debt Sinking Fund, including the note of the city for \$200,000 00	665,583 82
Net Water Debt, November 30, 1899	<u>\$2,606,516 18</u>

to the financial operations of the department, and the statement of the Registrar, which accompanies this report.

W A T T S : H A N D L E

At present, in October, 1908, the water has now more or less full, and the amount of water that flows through gutters per day was estimated at 1000 gallons. The water is very pure. On the first day of the season, the water level was 10 feet below high water mark. The water level in the Spring Branch reservoir is being maintained at 10 feet below high water mark. Fresh Pond is about 10 feet below high water mark.

[illegible]

NO. 1177 - 1 - 10 W 4700.

1. The first of these is the fact that the United States has a large and growing population of people who are of Mexican descent. This population is concentrated in the southwestern United States, particularly in California, Arizona, and New Mexico. It is estimated that there are over 10 million people of Mexican descent in the United States, and this number is expected to increase significantly in the future.

1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator who is responsible for the study. The investigator must first identify the problem that is being investigated. This is done by the investigator who is responsible for the study. The investigator must first identify the problem that is being investigated.

From that point the advance has been as follows :

In 1891	64.71 gallons.
In 1892	66 gallons.
In 1893	74.50 gallons.
In 1894	69.19 gallons.
In 1895	71.65 gallons.
In 1896	75.90 gallons.
In 1897	76.46 gallons.
In 1898	85.69 gallons.

These figures show clearly that some cause other than mere legitimate use of water is at work, and it cannot be doubted that the large increase in daily *per capita* consumption is due almost wholly to waste and leaks in pipes and water fixtures upon the premises of water takers. It is obvious that something must be done at once to stop this unnecessary waste, or a new pipe must be laid from Stony Brook to Fresh Pond. The cost of a new pipe at the present price of iron and labor would be between five hundred thousand and six hundred thousand dollars. For this sum bonds would have to be issued, under a new act of the Legislature, which should be applied for at once if it is to be needed, and the annual interest and sinking fund requirements would exceed thirty-five thousand dollars.

NEW CONDUIT OR A METER SYSTEM.

For some years the Water Board has advised the City Council that the increased consumption would before long require the laying of an additional conduit from Stony Brook. This year it became evident that such conduit must be laid, without delay, or else that the consumption must be reduced by controlling leaks and waste on the premises of the water takers. The Board, after careful investigation and consideration, extending over almost the entire fiscal year, finally concluded that the only reasonable course was the adoption of the meter system, which has been successfully and acceptably put into practice in Lowell, Worcester, Providence, Fall River, Pawtucket, Brockton, Taunton, Newton, Brookline, and many other cities, and so recommended to the City Council.

The daily average consumption *per capita* in these cities is about one-half of the consumption in Cambridge.

Our recommendation was based on the following reasons, viz. :

1. The Board did not feel warranted in incurring an expense of between five and six hundred thousand dollars in laying a new conduit from Stony Brook to Fresh Pond while, under a meter system, waste being checked, the present conduit would furnish sufficient water for ten,

appear excessive, but at present, with our expenditures exceeding our receipts, as in the past two years, we think an abatement of the charges should be made except for services actually rendered.

As to the charge for rent no other department is obliged to pay such charges. Moreover, we were obliged to vacate the apartment formerly used by us as a shop, and yet no reduction has been made in the amount of the rent charges, although as a result of our vacating the shop in City Hall we were compelled to erect a shop at the Auburn Street yard of the Water Works.

RECEIPTS.

As last year, our expenditures have exceeded our receipts, the deficit this year being \$240.27.

During the past year the Board has been deprived, by resignation from office, of the valued services not only of its President for many years, Hon. J. M. W. Hall, but also of Hon. Frank A. Allen, one of its most active and esteemed members. Both of these gentlemen had previously served the City with credit and distinction in the office of Mayor.

It is impossible to sufficiently acknowledge the long, faithful and intelligent service rendered the City by Mr. Hall. Elected a member of the Board in 1881, he served the City for eighteen years, the last five years as President of the Board.

The citizens of Cambridge can have but a slight knowledge of the inestimable value of Mr. Hall's devotion to the duties of his office. Especially during the inception and construction of the Hobbs Brook basin, as president of the Board he was called upon to give hour after hour, day after day, to the service of the city, to the temporary neglect of his private business interests. His devotion to duty as represented by the city's interests was something almost unparalleled, and has seldom been equalled.

He retires from the Board with the utmost respect and esteem of his fellow members, and with their heartiest best wishes that his success in business life may be as marked as was his administration of the affairs of the Water Board.

Mr. Allen is a splendid example of typical American citizenship. A successful business man, without any ambition for public life, but consenting to serve the city only because of the conviction that the best interests of the city demanded the sacrifice of his time and inclination. That he should have given five years of his time in the very busiest and most trying period in the construction of the water works, speaks volumes

His long and varied experience in business rendered him
 well qualified to advise the Board, and his mature and sound judgment
 was of great value to the Board.

Respectfully submitted,

WILLIAM B. DURAN.	
GEORGE H. HOWARD.	<i>Cambridge</i>
STEELEMAN F. KELLEY.	<i>Harvard</i>
WELLINGTON FLEMING.	<i>Harvard</i>
EDMUND H. STEVENS.	

REPORT OF THE WATER REGISTRAR

WATER REGISTRAR'S OFFICE,
CAMBRIDGE, December 5, 1899.

To the Cambridge Water Board:—

GENTLEMEN:—In compliance with the requirements of the City Ordinance, I present the thirty-fifth annual report of the operations of this department showing the receipts, expenditures and abatements, together with a statement of the number of water takers, etc., for the year ending November 30, 1899.

Amount of bills remaining unpaid, November 30, 1898:—

Water rates	\$154 85
Meter rates	1,176 42
Supplies and repairs	1,270 24
Off and on	124 00
Seals	10 75
Maintenance account	79 15
Construction account	76 38

Amount of bills placed in hands of City Treasurer for collection from November 30, 1898 to November 30, 1899:—

Water rates	\$222,746 88
Meter rates	86,627 90
Supplies and repairs	6,464 11
Off and on	824 00
Fines	20 00
Rents	243 00
Seals	148 75
Maintenance account	2,426 97
Construction account	1,360 00

Total bills	<u>\$323,753 40</u>
-----------------------	---------------------

There has been collected:—

Water rates	\$218,305 23
Meter rates	87,054 92
Supplies and repairs	6,592 26
Off and on	779 00
Fines	20 00
Rents	243 00
Seals	155 75
Maintenance account	1,830 09
Construction account	1,860 00

WATER REGISTAR

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There has been stated

Water rates, off and on and on	04,978 30
Expenses and repairs	194 77

There has been also stated

Water rates	0377 35
Water rates	142 40
Expenses and repairs	943 32
Off and on	110 00
Expenses	2 00
Maintenance account	676 00
Maintenance account	76 20
	<u>0323,763 40</u>

EXPENDITURES

Construction account general	033,361 00
Construction account Fresh Pond Land	113 00
Construction account Fresh Pond Reservoir	97 72
Construction account H. J. B. Reservoir	11,476 17
Maintenance account general	61,630 41
Expenses account	6,316 00
	<u>0114,407 30</u>

STATEMENTS

Water rates to the amount of	04,978 30
Expenses and repairs to the amount of	194 77
	<u>05,173 07</u>

RECEIPTS

Water rates to the amount of	02,791 13
Water account deducted from the receipts	303 26 13
	<u>02,487 87</u>
Expenses for receipts for water	02,487 87
and off and on, from rates, on and Maintenance account	3,077 00
	<u>0205,564 87</u>

OFF AND ON

Water has been shut off for nonpayment of rates, or for order on account of the same, and on and on have been applied to fixtures by request of the same, as follows:

Water shut off in 1900	704
Expenses on and on, shut off in 1900	436
Expenses on and on, shut off in previous years	91
Expenses on and on	200
Expenses applied to fixtures in 1900	200
Expenses removed, put on in 1900	130
Expenses removed, put on in previous years	100

Statement of the yearly revenue received from water rates since the purchase of the works by the city :

From April 28, 1865, to December 1, 1865	\$32,367 19
From December 1, 1865, to December 1, 1866	40,073 27
From December 1, 1866, to December 1, 1867	52,783 62
From December 1, 1867, to December 1, 1868	63,747 42
From December 1, 1868, to December 1, 1869	76,149 30
From December 1, 1869, to December 1, 1870	92,605 95
From December 1, 1870, to December 1, 1871	111,782 65
From December 1, 1871, to December 1, 1872	127,201 30
From December 1, 1872, to December 1, 1873	146,117 32
From December 1, 1873, to December 1, 1874	153,634 27
From December 1, 1874, to December 1, 1875	138,880 37
From December 1, 1875, to December 1, 1876	179,166 76
From December 1, 1876, to December 1, 1877	154,843 59
From December 1, 1877, to December 1, 1878	157,443 91
From December 1, 1878, to December 1, 1879	164,681 90
From December 1, 1879, to December 1, 1880	173,325 49
From December 1, 1880, to December 1, 1881	170,062 73
From December 1, 1881, to December 1, 1882	177,430 80
From December 1, 1882, to December 1, 1883	179,361 89
From December 1, 1883, to December 1, 1884	161,526 27
From December 1, 1884, to December 1, 1885	185,544 36
From December 1, 1885, to December 1, 1886	199,404 43
From December 1, 1886, to December 1, 1887	204,748 64
From December 1, 1887, to December 1, 1888	211,156 27
From December 1, 1888, to December 1, 1889	221,124 70
From December 1, 1889, to December 1, 1890	231,116 32
From December 1, 1890, to December 1, 1891	227,054 53
From December 1, 1891, to December 1, 1892	237,527 08
From December 1, 1892, to December 1, 1893	242,219 78
From December 1, 1893, to December 1, 1894	250,032 71
From December 1, 1894, to December 1, 1895	268,813 62
From December 1, 1895, to December 1, 1896	281,030 00
From December 1, 1896, to December 1, 1897	291,457 62
From December 1, 1897, to December 1, 1898	297,129 78
From December 1, 1898, to December 1, 1899	302,569 00

RECEIPTS.

The receipts for water as given in the above statement show a gain of \$5,400 as compared with the collections for 1898. The normal gain is about \$10,000 per annum, the stagnation in building operations being partially the cause of the loss, and the setting of meters during the year and consequent collection of but five-twelfths of the annual rates is responsible for the remainder of the loss.

All the annual water rate charges have been paid, the only charges remaining unpaid being for additional fixtures (\$277.55) and for metered water (\$142.60), in all, \$420.15 out of a total of \$310,000.

METERS

The Board of the Board decided to set meters to cover domestic consumption at the option of the owners. About one hundred fifty private houses took advantage of the opportunity, the meters applied for being mostly for three or more families almost exclusively. The Board of the Board having reason to believe a saving could be effected from water rates. The results show a loss in revenue of about eleven per cent as compared with the collection at a fixed rate.

Next morning the Board ordered about one hundred sixty meters set in the public houses and streets of the city. The revenue received from these meters for the month of the month also an annual increase of twenty eight per cent as compared with the former charges at a fixed rate.

It seems to be a fair conclusion that the city would meet with no loss as a result of setting meters, and, unquestionably, the present excessive waste of water would be discontinued after the installation of meters.

COMPARATIVE STATEMENT *Continued*

1898	Expenditures allowed, excess of expenditures ..	\$4,877 79	
	Receipts allowed, excess of receipts ..	\$71 87	
	Excess of total expenditures over total receipts ..		\$4,805 92
1899	Expenditures allowed, excess of expenditures ..	\$498 67	
	Receipts allowed, excess of receipts ..	\$28 30	
	Excess of total expenditures over total receipts ..		\$470 37

The excess of expenditures as shown in the statement for 1898, amounting to \$4,805.92, has been paid to the City Treasurer from the balance of the water works on construction account, and the amount advanced to the said construction account when there are sufficient receipts to warrant it.

The excess of expenditures as shown in the statement for 1899, amounting to \$470.37, has been advanced from the city treasury, and will be repaid when the surplus receipts will warrant it. These accounts showing the transactions of the past two years, stand as follows:

Advanced from construction account ..	\$3,376 87
Advanced from funds of the city ..	1,073 50
To be paid from surplus receipts when opportunity offers ..	\$4,450 37

As regards the manufacture, business blocks, houses, etc., supplied through meters, water is supplied to 19,245 families, 541 stables, 1,125 stores and 116 schools, 1,000 churches, 1,200 stores and offices, by the following fixtures, viz:

22 1" faucets	48 urinals
• 612 wash basins	14 yard hydrants
• 100 wash tubs	6 fountains
• 231 bath tubs	26 laundry washers
27' pump chests	3 1/2" hand hose
• 100 pump chests	13 meters
• 60 pump chests	

Also:

- 245 fire hydrants (about 17 on private premises)
- 6 fire reservoirs
- 20 drinking fountains in public squares
- 10 street watering canisters
- 6 public coolers

The above schedule of fixtures does not include those in school-houses, engine houses, police stations, and other city buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made with excellent results.

Respectfully submitted,

WALTER H. HARDING,

Registrar.

ANNUAL STATEMENT OF THE WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DECEMBER 1, 1899.

Water rates repaid November 30, 1899	\$1 11 37	
Expenses on water repaid November 30, 1899.	1,270 26	
Refund on water repaid November 30, 1899	126 00	
Water rates November 30, 1899	10 75	
Water rates repaid November 30, 1899	79 15	
Water rates repaid November 30, 1899	76 34	
		\$2,491 79

By the Water Registrar of City Treasurer
for the year ending December 1, 1899.

Water rates from annual ledger	\$211,016 30	
Water rates from fractional ledger	9,730 30	
Water rates from meter ledger	46,437 70	
Refund on water	426 00	
Interest	20 00	
Loss	247 00	
Gain	144 75	
Expenses and repairs	1,414 11	
Water rates - balance	2,479 07	
Refund on water	1,300 00	
		\$171,461 42

\$171,461 42

Water rates from ledger	\$211,016 30	
Water rates from ledger	9,730 30	
Water rates from ledger	46,437 70	
Refund on water	426 00	
Interest	20 00	
Loss	247 00	
Gain	144 75	
Expenses and repairs	1,414 11	
Water rates - balance	1,300 00	
Expenses and repairs	6,277 30	

\$116,560 35

Water rates off and on and on	\$1,070 30	
Expenses and repairs	170 00	
		\$1,240 30

There remains uncollected : —

Water rates	\$420 15	
Supplies and repairs	943 32	
Off and on	118 00	
Seals	2 00	
Maintenance account	676 03	
Construction account	76 88	
	<hr/>	2,235 88
Total bills for collection		<hr/> \$323,753 40
Less abated	\$5,177 27	
Less refunded	2,791 15	
Less unpaid	2,235 88	
	<hr/>	10,204 80
Net receipts		<hr/> <hr/> \$313,549 10

Attest :

WALTER H. HARDING,
Registrar.

CAMBRIDGE, December 14, 1899.

I have examined the accounts of the Water Registrar and find that they correspond in the amounts collected, abated, refunded and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor.

STILLMAN F. KELLEY,
Committee on Accounts.

STATEMENT OF THE CITY TREASURER.

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CITY OF CAMBRIDGE.
 OFFICE OF CITY TREASURER,
 December 1, 1899.

My dear Sir:

I give you herewith a record of the transactions of the City Office and the City Treasurer's Office during the year ending November 30, 1899.

Balance forward for account of Water Works Rates, Snow etc.	\$111,336 40
Amount received for rates received and paid on Water Rates	6,970 20
Balance forward for account of Water Works Supply Account	6,791 00
Amount received for rates received and paid on Supply Account	194 77
Amount received for rates have been received and paid to the amount of	2,771 18
Amount paid to the City of Cambridge November 30, 1899 for account of	
Water Works Construction and Water Rates amount to	1,792 36
Amount paid to the City of Cambridge November 30, 1899 for account of	
Water Works Repairs etc. amount to	943 32
Amount received for account of Water Works Construction	
and Repairs	1,735 00
Amount received for account of Water Works Construction,	
Repairs and Repairs	63 00
Amount received for account of Water Works Maintenance,	
and Repairs	1,450 00

Very respectfully,

WM W DALLINGER,

City Treasurer.

I have examined the above statement and find it correct.

HARRY T. UPHAM,

City Auditor.

REPORT OF THE SUPERINTENDENT OF WATER WORKS

CAMBRIDGE, December 1, 1899.

To the Honorable Water Board of the City of Cambridge:

GENTLEMEN:—Complying with the City Ordinance, I herewith submit the twenty-fifth annual report of the Superintendent, for the year ending November 30, 1899.

CONSUMPTION.

Total quantity of water pumped during the past year	2,882,370,430 gallons
Daily average water pumped during the past year	7,897,453 "
Quantity of water sold by meter	644,920,500 "
Quantity of water used for sprinkling streets	107,901,125 "
Quantity of water used for flushing sewers	1,250,000 "
Quantity of water used for cleaning sanitaries	7,500,000 "
Quantity of water used for drinking fountains	35,000,000 "
Total	796,571,625 "
Leaving for domestic purposes	2,085,998,805 "

Number of gallons daily for each inhabitant on the total amount pumped, 87.16.

Number of gallons daily for each inhabitant on the total amount used for domestic purposes, including water for private stables, hose, public buildings and fire purposes, 63.08.

COMPARATIVE STATEMENT OF TOTAL PUMPING DURING THE PAST TEN YEARS.

Date.	Total Yearly Pumping.	Increase or Decrease.	Average Daily Pumping.	Increase or Decrease.	Gallons to each Inhabitant daily.
1890..		inc.	4,489,179	307,155 increase.	62.35
1891..			4,877,888	388,709 "	64.71
1892..			5,339,915	462,027 "	66
1893..			6,122,916	783,000 "	74.50
1894..		dec.	5,929,994	293,111 decrease.	69.19
1895..		inc.	6,002,142	72,338 increase.	71.65
1896..			6,594,249	592,107 "	75.90
1897..			6,684,603	90,354 "	76.46
1898..			7,650,115	965,512 "	85.69
1899..			7,897,453	247,338 "	87.16

STATEMENT OF THE REVENUE DURING THE YEAR
1880.

Source of Revenue.	Amount Received.	Amount Paid.	Balance.
Water	1,234,567	1,000,000	234,567
Gas	567,890	400,000	167,890
Electricity	123,456	100,000	23,456
Lighting	456,789	300,000	156,789
Amusement	789,012	600,000	189,012
Other	234,567	100,000	134,567
Total	3,245,678	2,500,000	745,678
Balance forward			745,678
Balance backward			745,678
Total			1,491,356
Water	1,234,567	1,000,000	234,567
Gas	567,890	400,000	167,890
Electricity	123,456	100,000	23,456
Lighting	456,789	300,000	156,789
Amusement	789,012	600,000	189,012
Other	234,567	100,000	134,567
Total	3,245,678	2,500,000	745,678
Balance forward			745,678
Balance backward			745,678
Total			1,491,356

Source of Revenue.	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889
Water	1,234,567	1,345,678	1,456,789	1,567,890	1,678,901	1,789,012	1,890,123	1,901,234	2,012,345	2,123,456
Gas	567,890	678,901	789,012	890,123	901,234	1,012,345	1,123,456	1,234,567	1,345,678	1,456,789
Electricity	123,456	234,567	345,678	456,789	567,890	678,901	789,012	890,123	901,234	1,012,345
Lighting	456,789	567,890	678,901	789,012	890,123	901,234	1,012,345	1,123,456	1,234,567	1,345,678
Amusement	789,012	890,123	901,234	1,012,345	1,123,456	1,234,567	1,345,678	1,456,789	1,567,890	1,678,901
Other	234,567	345,678	456,789	567,890	678,901	789,012	890,123	901,234	1,012,345	1,123,456
Total	3,245,678	3,678,901	4,123,456	4,567,890	5,012,345	5,456,789	5,890,123	6,345,678	6,789,012	7,234,567

FRESH POND AND SURROUNDINGS.

The work around the pond has consisted of the usual care of the roadways, walks, planted sections and grass plots, together with the care of the nursery.

About eight hundred dollars (\$800.00) worth of stock has been sold from the nursery this year, owing to our having no appropriation for using the same on graded sections.

The riprapping around the pond, which was displaced by the ice last winter, has been replaced, and the fence repaired where needed.

The height of the pond has been at an average of 15.31 feet, and the water has been of its usual good quality.

The low water during the past fall has given opportunity for cleaning out a large amount of weed-growth in the shallow portions of the pond.

The buildings are in good condition, and will need very slight repairs the coming year.

FRESH POND RESERVOIR.

DATE.	Lowest elevation during month.	Highest elevation during month.	Monthly Rain-fall, inches.	INTAKE GATE.			
				8-inch Opening.		30-inch Opening.	
				Opened.		Opened.	Closed.
1898.							
Dec. 4.....	16.28	.....	2	During entire month.	28 turns.	During entire month, 30 ins.	
Dec. 27.....	.....	16.72	.....			
1899.							
Jan. 25.....	16.14	.....	3.85	During entire month.	From 1st to 26th, 28 turns.		January 25th.
Jan. 27.....	.....	17.15	.....			
Feb. 26.....	15.84	.....	3.99	During entire month.	From 26th to 31st, 1 1/2 turns.		
Feb. 2. ....	.....	16.88	.....			
Mar. 1.....	15.85	.....	5.94	During entire month.	From 1st to 20th, 15 1/2 turns.		
Mar. 27.....	.....	17.02	.....			
Apr. 3).....	16.31	.....	1.32	During entire month.	From 20th to 28th, 28 turns.		
Apr. 3 .....	.....	16.94	.....			
May 30.....	16.12	.....	.77	During entire month.	From 1st to 26th, 28 turns.		
May 6 ....	.....	16.47	.....			
June 30.....	15.07	.....	3.17	During entire month.	From 26th to 31st, 9 1/2 turns.		
June 1.....	.....	16.16	.....			
July 30.....	13.86	.....	3.12	During entire month.	From 1st to 26th, 9 1/2 turns.		
July 1.....	.....	15. '9	.....			
Aug. 30.	13.43	.....	3.21	During entire month.	From 26th to 30th, 28 turns.		
Aug. 2.....	.....	13.98	.....			
Sept. 19.....	13.17	.....	4.63	During entire month.	28 turns.		
Sept. 2.....	.....	13.61	.....			
Oct. 6.....	13.36	.....	3.08	During entire month.	28 turns.		
Oct. 30.....	.....	13.64	.....			
Nov. 2.....	13.65	.....	2.20	During entire month.	Closed for ten hours, Oct. 31st		For ten hours, October 31st.
Nov. 29.....	.....	14.24	.....			
Total.....			37.28				

PUMPING STATION AND GROUNDS

The grounds around the Pumping Station have received the usual amount of grading is necessary to put them in satisfactory condition.

The engine and boilers have been in operation throughout the season and have done very satisfactorily.

A trial run of the engine and boilers was made during June last, and the result was that Professor Ira N. Hollis, of the Lawrence Scientific School, gave a rate of 128,817,000 ft lbs. per one hundred pounds of New River coal, dry. The engine is doing better than this in regular work.

The engine has been built for the Chief Engineer of the Pumping Station, the land belonging to the Water Works, situated east of the New River, near the corner of Worthington Street.

HIGHLAND STREET RESERVOIR

The reservoir remains in the same condition as last year, nothing new has been done except the cutting of grass on the banks and the care of the water.

PAYSON PARK RESERVOIR

The reservoir at Payson Park has received the necessary care, and the water has been kept up and painted.

The level of the water has been maintained at an average of about 10 feet above the level of the city, and the leakage, as shown by the meter on the side of the reservoir, is about 100,000 gallons per day.

PIPE YARD

The pipe yard at the rear of the shop from the City Hall, which has been in use for several years, has been effected by the City Engineer, Mr. C. H. Heston, M. C. Heston, architect, of the City of New York, to be a brick shop, to be located on the site of the old pipe yard. The contract was awarded to Messrs. E. W. Heston & Co.

The pipe yard was built at public and private expense.

The pipe yard has been removed from the old shop and set up, as has the engine and boiler, in the new shop.

The engine and boiler in the new shop have been connected with the shafting and the water has been put in the tank. The engine and boiler have been in operation since the 1st of June.

The water testing room in the station has been fitted with tank, and the water testing machine for the testing of all water meters.

The dwelling house has been shingled and other repairs made, putting the whole in good condition.

PIPE BRIDGES.

The sixteen-inch (16) pipe across Brookline Bridge, which was damaged by the high tide last year, has been removed and stored at the pipe yard.

The building of the new bridge over the Fitchburg Railroad on Massachusetts Avenue has been delayed so that the twelve-inch (12) connection across the same has not been put in, but will be, in all probability, during the coming winter.

HIGH SERVICE.

No extension has been made on the high service system during the year.

Sixteen streets have been taken off, as the present pressure is sufficient to amply supply the elevations of the locations removed.

Following will be found a list of the streets that are at date supplied by the high service, November 30, 1899.

Agassiz Street.
 Appleton Street, from Brattle Street
 to beyond Hutchinson Street.
 Arlington Street.
 Avon Hill Street.
 Bates Street.
 Bellevue Avenue.
 Bellevue Avenue, west.
 Brattle Street, from Appleton Street
 to Mason Street.
 Brewster Street.
 Buena Vista Park.
 Centre Street.
 Chatham Street.
 Cleveland Street.
 Dana Street, from Massachusetts Ave-
 nue to Broadway.
 Dunster Street, from Massachusetts
 Avenue to Mt. Auburn Street.
 Ellery Street, from Massachusetts Ave-
 nue to Broadway.
 Garden Street, from Huron Avenue to
 Linnaean Street.
 Garden Street, from Mason Street to
 Massachusetts Avenue.
 Harvard Street, from Quincy Street to
 Dana Street.
 Harvard College Campus.
 Highland Street.

Hillside Avenue.
 Holly Avenue.
 Humboldt Street.
 Huron Avenue, from Appleton Street
 to Raymond Street.
 Lancaster Street.
 Linnaean Street.
 Mason Street.
 Massachusetts Avenue, from Garden
 Street to Quincy Street.
 Massachusetts Avenue, from near
 Trowbridge Street to Dana Street.
 Mt. Pleasant Street.
 Mt. Vernon Street.
 Quincy Street, from Harvard Street to
 Broadway.
 Raymond Street, from Linnaean Street
 to Walden Street.
 Reservoir Street, from Highland Street.
 Riedesel Avenue.
 Spark Street, from Huron Avenue to
 Brattle Street.
 Upland Road, from Richdale Avenue
 to Huron Avenue.
 Vassal Lane, from Huron Avenue.
 Vincent Street.
 Walnut Street.
 Ware Street.
 Washington Avenue.

LIST OF CHECK VALVES IN USE.

1. Check valve at H. H. Hunt Street
 2. Check valve at Massachusetts Avenue
 3. Check valve at intersection of gas pipe crossing College Ground
 4. Check valve at Lincoln Street
 5. Check valve at street, 100 feet west from Massachusetts Avenue,
 on the street at Massachusetts Avenue.
 6. Check valve at Wallen Street

LEAKAGE.

The number of twenty four hundred sixty two (2,462) leaks reported during the year.

It is to be noted that this number is the largest annual amount ever reported, exceeding the account of last year (1918) by ten thousand three hundred and thirty four (10,334).

This increase is the result of a special and very careful inspection made during the season for the detection of leaks, in order to diminish the amount of loss of water, which had become considerably increased by our increasing population.

In cases of defective mains or supplies in streets, these leaks have been reported to the department, and on the premises the occupants or owners have made the necessary repairs.

The leaks were distributed as follows:

Two hundred and twenty four inch main

Three hundred and thirty eight inch main

Four hundred and thirty eight inch main

Five hundred and thirty eight inch main

Two hundred and thirty eight inch main

One hundred and thirty eight inch main

Two hundred and thirty eight inch main

One hundred and thirty eight inch main

One hundred and thirty eight inch main

One hundred and thirty eight inch main

One hundred and thirty eight inch main

One hundred and thirty eight inch main

Total 2,462

A number of leaks was caused in June, 1919, at the intersection of Hunt Street and the street of laying the new gas mains for the Massachusetts Pipe and Gas Company was being carried on. The cost of the necessary repairs was paid by the Company.

TABLE SHOWING A GAIN OR LOSS IN TOTAL CONSUMPTION FOR THE YEAR 1899 OVER THE YEAR 1898.

	Total Consump- tion, 1899.	Total Consump- tion, 1898.	Increase or De- crease, + or -.
December.....	250,820,840		+ 39,517,500
January.....	265,444,480		+ 30,808,940
February.....	269,707,880		+ 47,781,780
March.....	239,808,330		+ 5,005,245
April.....	211,254,880		- 1,006,720
May.....	239,712,880		+ 24,633,920
June.....	259,134,040		+ 17,523,880
July.....	279,294,200		+ 27,434,640
August.....	242,280,280		- 25,299,320
September.....	226,769,400		- 2,544,520
October.....	219,751,280		- 49,134,885
November.....	194,800,040		- 25,742,640
Total.....	2,862,570,480		+ 80,349,320

MAIN PIPE.

Main pipes have been laid in the following streets: 281 feet of 6-inch in Belmont Street (extension); 185 feet of 6-inch in Bent Street, from First Street; 132 feet of 6-inch in Bird Street, from Belmont Street; 142 feet of 1½-inch in Blair Place, from Bolton Street; 344 feet of 6-inch in Bolton Street, for the Street Department, and 521 feet of 6-inch from Sherman Street; 358 feet of 6-inch in Camelia Avenue, from Cambridge Street; 140 feet of 6-inch in Chatham Street, from Dana Street; 114 feet of 1½-inch in DeWolf Place; 1102 feet of 6-inch in the Esplanade; 191 feet of 6-inch in Fairview Avenue; 1463 feet of 6-inch in Franklin Street, from Magazine Street to Sidney Street, in place of 4-inch removed; 506 feet of 6-inch in Garden Street, from Concord Avenue to Waterhouse Street, and 351 feet of 6-inch from Waterhouse Street to Mason Street in place of 6-inch removed; 182 feet of 6-inch in Hardwick Street, from Berkshire Street; 214 feet of 6-inch in Herbert Street, from Richdale Avenue to Cambridge Terrace; 543 feet of 4-inch in Jordan Place, from Broadway; 392 feet of 6-inch in Lawn Court, from May Street; 428 feet of 6-inch in Magazine Street, from Glenwood Street, and 460 feet of 1½-inch at Captain's Island; 377 feet of 8-inch in Massachusetts Avenue, from Albany Street to Vassar Street; 975 feet of 6-inch, from Chauncy Street to Sacramento Street, in place of 6-inch removed; 2439 feet of 12 inch, from Inman Street to Putnam Avenue, in place of 8-inch removed; 129 feet of 10-inch from Putnam Square to beyond Trowbridge Street, in place of 10-inch removed; 793 feet of 6-inch from Sacramento Street to Linnaean Street, in place of 6-in removed, and 737 feet of 6-inch from Waterhouse Street to Chauncy Street, in place of 6-inch removed;

M. Street to the other side of Avenue Street.

100 feet to the other side of Avenue Street.

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Length of Pipe

Weight of Pipe

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100 feet to the other side of Avenue Street.

100 feet to the other side of Avenue Street.

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In Springfield Street, at Cambridge Street, the 6-inch pipe has been relocated and renewed, and in Auburn, Fairmont and Rockwell Streets the main pipes have been offset for the accommodation of this Gas Company, it paying all cost of material furnished and labor performed.

The water has been shut off from the 6-inch main in Willis Court.

The Metropolitan Park Commission has taken the land on the south side of Mt. Auburn Street bordering on Charles River, including this Willis Court, which eventually will be discontinued.

An air-valve has been set in the 20-inch main pipe in Broadway, at Prospect Street.

SUPPLIES.

Total number of supplies at date, November 30, 1899, fourteen thousand forty-nine (14,049).

There have been three hundred eight (308) additional supplies laid during the year.

One hundred fifty (150) old supplies have been furnished with sidewalk cocks and service boxes.

One hundred forty-nine (149) service boxes have been set on the small supplies, where the Water Board has placed meters during the year.

Three hundred thirty-two (332) old supplies have been renewed.

As the work on renewal of mains in the streets was being done, the supplies following were renewed at the expense of the Water Board in the streets; any work on the premises was charged to the owners of the property.

In Fairview Avenue	1	In Oxford Avenue	1
In Franklin Street	29	In Pacific Street	3
In Garden Street	3	In Pearl Street	44
In Jordan Place	3	In Pilgrim Street	7
In Massachusetts Avenue, from Inman Street to Putnam Ave.	31	In Portland Street	8
In Massachusetts Avenue, from Linnaean Street to Waterhouse Street	18	In Prospect Street	52
		In Sidney Street	6
		In Waterhouse Street	2

Total number of supplies renewed on this work, two hundred eight (208).

The number of supplies renewed on usual maintenance work was one hundred thirty-two (132); of these eighteen were enlarged.

Anticipating the future condition of Pearl, Prospect and Portland Streets, which have been paved and the surface of which is not to be disturbed, all the supplies have been located, ninety-six (96) renewed and twenty (20) new one-inch supplies laid to the vacant lots.

In Pearl Street forty-four (44) have been renewed and three (3) new

On March 22, 1901, at Portland Street eight (8) new supplies have been laid; and at Market Street fifty-two (52) have been renewed and nine (9) new supplies have been laid.

There have been no changes in the number of new and renewed supplies at the other streets.

At Portland Street and Market Street, the supplies have been offset with the same material as the old ones, with the exception of the pipes laid by the Water Board. In the case of the latter, the expense was paid for by the City.

At Market Street, the old supplies have been renewed with the same material.

The New York and London Telegraph Company has required the City to pay for the cost of setting supplies for the accommodation of their lines, and the City has agreed to do so at its expense.

The City has also agreed to pay for the cost of supply service boxes has been made in the case of the City of New York, which has been raised to grade as the City has done.

DRINKING FOUNTAINS

The City has no drinking fountains at present in the City. The only drinking fountains are those of the City of New York, which are located at the corners of the City of New York, and are located at the corners of the City of New York.

The City has no drinking fountains at the corner of Cambridge and Market Streets, and the City has no drinking fountains at the corner of Portland Street and Market Street, and the City has no drinking fountains at the corner of Portland Street and Market Street.

The City has no drinking fountains at the corner of Portland Street and Market Street, and the City has no drinking fountains at the corner of Portland Street and Market Street, and the City has no drinking fountains at the corner of Portland Street and Market Street.

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STREET WATERING STANDPIS

The City has no street watering standpises at present in the City. The only street watering standpises are those of the City of New York, which are located at the corners of the City of New York, and are located at the corners of the City of New York.

The City has no street watering standpises at the corner of Portland Street and Market Street, and the City has no street watering standpises at the corner of Portland Street and Market Street, and the City has no street watering standpises at the corner of Portland Street and Market Street.

GATES.

Forty-seven gates have been set in connection with extensions and renewals as follows :

Three (3) 4-inch ; thirty-three (33) 6-inch ; three (3) 8-inch ; two (2) 10-inch ; and six (6) 12-inch.

Six (6) gates have been set on supplies ; four (4) 4-inch ; one (1) 6-inch ; and one (1) 8-inch.

In Walden Street, corner of Mt. Pleasant Street, the 6-inch gate has been removed, and a new 6-inch set in its location.

One 6-inch gate has been set on the hydrant branch at the corner of Sidney Street and Massachusetts Avenue.

One 6-inch gate has been set in Irving and Casson's on Otis Street.

One 4-inch gate has been set in Madison Street, corner of Concord Avenue, in place of old one broken.

All the gates in the city have been inspected and their locations marked.

BOXES.

Thirty-nine (39) gate boxes have been set in place of old ones removed ; sixteen (16) wooden, two (2) hydrant, and twenty-one (21) iron.

Nineteen (19) boxes have been set on the work of extension and renewal ; thirteen (13) wooden and six (6) iron.

Eighty (80) boxes have been placed on meters set during the year ; forty (40) wooden and forty (40) iron.

Total number of boxes set, one hundred thirty-eight (138).

During the year the Street Department has found it necessary to change the grades in many of the streets, and at its request, the gate boxes have been raised or lowered as occasion required.

The expense of this work was, as usual, cared for by this department.

METERS.

The total number now in use is six hundred nineteen (619).

Ball & Fitts	4	Nash	13
Buffalo	1	Thomson	9
Crown	44	Trident	177
Empire	2	Union Duplex	1
Frost	2	Union Rotary	46
Gem	1	Worthington	147
Hersey	172		

The largest annual number of meters set, i.e., one hundred seventy-two (172), has been added to the list this year.

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2. second of these is the fact that the
3. third of these is the fact that the
4. fourth of these is the fact that the
5. fifth of these is the fact that the
6. sixth of these is the fact that the
7. seventh of these is the fact that the
8. eighth of these is the fact that the
9. ninth of these is the fact that the
10. tenth of these is the fact that the

• **What is the purpose of the study?**

11-10-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-104

[illegible]

STONY BROOK

A fence about 2,500 feet of wire fencing has been built near the brook, to keep the cattle from the brook.

The drainage from the Washburn and Coburn Places has been carried to the brook, and the brook is now a stream.

Arrangements were made with the owners of the new brook, to have the water in Weston, to dispose of the drainage as to be of no use, and to get the water supply.

The drainage from the place, as far as the City, has been thoroughly cleaned up, and all the dirt about the place have been turned over to the owners, and the drainage about this place the coming year.

TABLE SHOWING THE DAILY AVERAGE NUMBER OF GALLONS, BY THE
CITY OF STONY BROOK, OVER THE WASTE WAY AT STONY BROOK.

GALLONS		NUMBER OF DAYS		GALLONS		NUMBER OF DAYS
1,000	1	11	June	1,000	1	11
2,000	2	12	July	1,000	2	12
3,000	3	13	August	1,000	3	13
4,000	4	14	September	1,000	4	14
5,000	5	15	October	1,000	5	15
6,000	6	16	November	1,000	6	16
7,000	7	17	December	1,000	7	17
8,000	8	18	January	1,000	8	18
9,000	9	19	February	1,000	9	19
10,000	10	20	March	1,000	10	20
11,000	11	21	April	1,000	11	21
12,000	12	22	May	1,000	12	22
13,000	13	23	June	1,000	13	23
14,000	14	24	July	1,000	14	24
15,000	15	25	August	1,000	15	25
16,000	16	26	September	1,000	16	26
17,000	17	27	October	1,000	17	27
18,000	18	28	November	1,000	18	28
19,000	19	29	December	1,000	19	29
20,000	20	30	January	1,000	20	30
21,000	21	31	February	1,000	21	31
22,000	22	1	March	1,000	22	1
23,000	23	2	April	1,000	23	2
24,000	24	3	May	1,000	24	3
25,000	25	4	June	1,000	25	4
26,000	26	5	July	1,000	26	5
27,000	27	6	August	1,000	27	6
28,000	28	7	September	1,000	28	7
29,000	29	8	October	1,000	29	8
30,000	30	9	November	1,000	30	9
31,000	31	10	December	1,000	31	10
32,000	32	11	January	1,000	32	11
33,000	33	12	February	1,000	33	12
34,000	34	13	March	1,000	34	13
35,000	35	14	April	1,000	35	14
36,000	36	15	May	1,000	36	15
37,000	37	16	June	1,000	37	16
38,000	38	17	July	1,000	38	17
39,000	39	18	August	1,000	39	18
40,000	40	19	September	1,000	40	19
41,000	41	20	October	1,000	41	20
42,000	42	21	November	1,000	42	21
43,000	43	22	December	1,000	43	22
44,000	44	23	January	1,000	44	23
45,000	45	24	February	1,000	45	24
46,000	46	25	March	1,000	46	25
47,000	47	26	April	1,000	47	26
48,000	48	27	May	1,000	48	27
49,000	49	28	June	1,000	49	28
50,000	50	29	July	1,000	50	29
51,000	51	30	August	1,000	51	30
52,000	52	31	September	1,000	52	31
53,000	53	1	October	1,000	53	1
54,000	54	2	November	1,000	54	2
55,000	55	3	December	1,000	55	3
56,000	56	4	January	1,000	56	4
57,000	57	5	February	1,000	57	5
58,000	58	6	March	1,000	58	6
59,000	59	7	April	1,000	59	7
60,000	60	8	May	1,000	60	8
61,000	61	9	June	1,000	61	9
62,000	62	10	July	1,000	62	10
63,000	63	11	August	1,000	63	11
64,000	64	12	September	1,000	64	12
65,000	65	13	October	1,000	65	13
66,000	66	14	November	1,000	66	14
67,000	67	15	December	1,000	67	15
68,000	68	16	January	1,000	68	16
69,000	69	17	February	1,000	69	17
70,000	70	18	March	1,000	70	18
71,000	71	19	April	1,000	71	19
72,000	72	20	May	1,000	72	20
73,000	73	21	June	1,000	73	21
74,000	74	22	July	1,000	74	22
75,000	75	23	August	1,000	75	23
76,000	76	24	September	1,000	76	24
77,000	77	25	October	1,000	77	25
78,000	78	26	November	1,000	78	26
79,000	79	27	December	1,000	79	27
80,000	80	28	January	1,000	80	28
81,000	81	29	February	1,000	81	29
82,000	82	30	March	1,000	82	30
83,000	83	31	April	1,000	83	31
84,000	84	1	May	1,000	84	1
85,000	85	2	June	1,000	85	2
86,000	86	3	July	1,000	86	3
87,000	87	4	August	1,000	87	4
88,000	88	5	September	1,000	88	5
89,000	89	6	October	1,000	89	6
90,000	90	7	November	1,000	90	7
91,000	91	8	December	1,000	91	8
92,000	92	9	January	1,000	92	9
93,000	93	10	February	1,000	93	10
94,000	94	11	March	1,000	94	11
95,000	95	12	April	1,000	95	12
96,000	96	13	May	1,000	96	13
97,000	97	14	June	1,000	97	14
98,000	98	15	July	1,000	98	15
99,000	99	16	August	1,000	99	16
100,000	100	17	September	1,000	100	17

STONY BROOK PIPE LINE

The pipe line from the brook to the city has been the past year has been the same as the one that was reported in our last report.

The pipe line from the brook to the city has been the same as the one that was reported in our last report.

The pipe line from the brook to the city has been the same as the one that was reported in our last report.

11-01-12- 11:00 AM

The ... of ... has been of such duration as to ...

There is a small amount of water used from Water Street Dam June 1st to 1st July 1914. The supply for the 1st has been from this dam.

The above information was furnished to the FBI and the State Department on 10/10/61. The FBI is currently conducting an investigation of the above information.

"The fact that the Commission has been able to obtain information from the Bureau, and to
be able to do so, is a very important factor in the investigation of the case."

1. The first is the fact that the United States has a long and proud history of supporting human rights and democracy around the world. This is a core value of our nation, and it is one that we must continue to uphold.

1. The first part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

2. The second part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

3. The third part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

4. The fourth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

5. The fifth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

6. The sixth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

7. The seventh part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

8. The eighth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

9. The ninth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

10. The tenth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

1. DATE _____

402 01 011100

	1	2	3	4	5	6	7	8	9	10	11
1. The number of persons in the household	1	2	3	4	5	6	7	8	9	10	11
2. The number of persons in the household who are under 18 years of age	1	2	3	4	5	6	7	8	9	10	11
3. The number of persons in the household who are 18 years of age or over	1	2	3	4	5	6	7	8	9	10	11
4. The number of persons in the household who are 65 years of age or over	1	2	3	4	5	6	7	8	9	10	11
5. The number of persons in the household who are 18 years of age or over and are not related to the head of household	1	2	3	4	5	6	7	8	9	10	11
6. The number of persons in the household who are 18 years of age or over and are not related to the head of household and are not the spouse of the head of household	1	2	3	4	5	6	7	8	9	10	11
7. The number of persons in the household who are 18 years of age or over and are not related to the head of household and are not the spouse of the head of household and are not the child of the head of household	1	2	3	4	5	6	7	8	9	10	11
8. The number of persons in the household who are 18 years of age or over and are not related to the head of household and are not the spouse of the head of household and are not the child of the head of household and are not the parent of the head of household	1	2	3	4	5	6	7	8	9	10	11
9. The number of persons in the household who are 18 years of age or over and are not related to the head of household and are not the spouse of the head of household and are not the child of the head of household and are not the parent of the head of household and are not the grandchild of the head of household	1	2	3	4	5	6	7	8	9	10	11
10. The number of persons in the household who are 18 years of age or over and are not related to the head of household and are not the spouse of the head of household and are not the child of the head of household and are not the parent of the head of household and are not the grandchild of the head of household and are not the great-grandchild of the head of household	1	2	3	4	5	6	7	8	9	10	11

1998

[illegible]

COMPARATIVE TRENCHING FOR THE PAST TEN YEARS.

	Extensions.	Renewals.	Supplies.	Total feet.	Miles.
1890.....	11,713½	1,929	15,525	29,167½	5.52
1891.....	9,858½	2,958	17,864	30,680½	5.81
1892.....	16,784½	13,628	16,013	46,425½	8.79
1893.....	18,380½	11,008	14,233½	43,622	8.26
1894.....	13,673	17,481½	17,211	48,365½	9.16
1895.....	11,083	15,638½	22,266	48,987½	9.27
1896... ..	17,621	26,043	17,361	61,025	11.55
1897.....	11,268	36,967½	16,121½	64,357	12.19
1898.....	11,045½	25,397	12,186	48,628½	9.21
1899.....	11,051½	9,427½	13,486½	33,965½	6.43

Following will be found the report of the Chief Engineer of the Pumping Station.

All of which is respectfully submitted,

E. C. BROOKS,
Superintendent.

REPORT OF THE PUMPING ENGINEER

December 1, 1909.

Presented to the Water Board of the City of Cambridge

respectfully. The machinery at the Pumping Station is in first-class condition. No. 1 Worthington engine was run sixty-four hours and No. 2 Worthington, sixty-six hours and forty minutes, and No. 3 engine, thirty hours and thirty minutes, during October, as they have been ordered to be running the year. The Leavitt engine has been in the water since the 1st of the past year, and still continues in good condition for service.

Work has been done in coating Nos. 1 and 2 boilers with magnesia and in the same way the steam piping and iron work in the fire room.

A new water gauge for showing the height of water in the reservoir was started December 1, 1909, working very satisfactorily to date.

Respectfully submitted,

E. L. HARRIS,

Chief Engineer

ENGINE RECORD, POND LEVELS AND RAINFALL.

1911

1912

1913

REPORT OF THE TRUSTEES OF THE SINKING FUND OF THE CAMBRIDGE WATER WORKS

Presented to the City Council

By the Trustees of the Sinking Fund of the Water Works, in compliance with the annual report of the fund committed by law to them. The report covers the year ending November 30, 1900.

Dr

Balance of the Fund November 31, 1899 \$347,000 00

Received during the year, as follows:

From the Treasurer of the City of Cambridge, the annual required appropriation from the water tax

From interest on investments

113,710 00
16,100 00
\$129,810 00

Cr

Amount paid for interest on investments purchased
Amount paid for premiums on investments purchased
Amount of the cash of the fund, November 31, 1900

\$40 00
7,221 00
607,240 00
\$127,061 00

EDWARD E. CHAMPLIN,
WILLIAM F. BROOKS,
WM. W. DALLINGER,

Trustees of the
Sinking Fund of
the Cambridge
Water Works

The following are the investments belonging to the fund:

Cambridge	do	Maturing Feb 1, 1913	\$2,000 00	
	do	Oct 1, 1914	25,100 00	
	11 2a	Dec 1, 1917	20,000 00	
	11 2a	Nov 1, 1919	20,000 00	
	do	Nov 1, 1920	2,000 00	
				\$127,100 00
Insurance	do	Apr 1, 1900	\$1,000 00	
Fire insurance R. I.	do	July 1, 1900	5,000 00	
Gas	do	May 1, 1900	1,000 00	
Electricity	do	Aug 1, 1900	10,000 00	

TRUSTEES OF SINKING FUND.

New Bedford	3 1-2s,	maturing	Feb. 1, 1909	\$16,000 00	
Methuen	4s,	"	Aug. 1, 1909	15,000 00	
Somerville	4s,	"	July 1, 1910	8,000 00	
Wellesley	4s,	"	Mar. 1, 1917	2,000 00	
Waltham	4s,	"	Apr. 1, 1917	24,000 00	
Hallowell, Me.	4s,	"	Jan. 1, 1918	15,000 00	
Wellesley	4s,	"	Mar. 1, 1918	1,000 00	
Penobscot Shore Line } R. R. Co.	4s,	"	Aug. 1, 1920	25,000 00	
Quincy	4s,	"	May 1, 1923	2,000 00	
"	4s,	"	May 1, 1924	1,000 00	
"	4s,	"	May 1, 1925	2,000 00	
"	4s,	"	May 1, 1926	3,000 00	
"	4s,	"	May 1, 1927	3,000 00	
Attleborough	4s,	"	July 1, 1927	10,000 00	
Quincy	4s,	"	May 1, 1928	3,000 00	
Winchester	4s,	"	June 1, 1928	6,000 00	
Quincy	4s,	"	May 1, 1929	3,000 00	
Fall River	3 1-2s,	"	Nov. 1, 1929	75,000 00	
Quincy	4s,	"	May 1, 1930	3,000 00	
"	4s,	"	May 1, 1931	3,000 00	
"	4s,	"	May 1, 1932	1,000 00	
Newton	4s,	"	Aug. 1, 1935	2,000 00	
"	4s,	"	July 1, 1936	11,000 00	
Grafton	3 1-2s,	"	July 1, 1937	1,000 00	
Old Colony R. R. Co.	4s,	"	Jan. 1, 1938	25,000 00	
Grafton	3 1-2s,	"	July 1, 1938	2,000 00	
"	3 1-2s,	"	July 1, 1939	2,000 00	
				<hr/>	\$333,000 00
					\$465,100 00
Cash in Bank	.	.	.	.	483 82
				<hr/>	\$465,583 82

The Bonded Water Debt, which the foregoing fund is to pay, matures as follows:—

Nov. 1, 1906,	.	.	.	.	3 1-2s	.	.	.	.	\$43,000 00
Oct. 1, 1907,	.	.	.	.	4s	.	.	.	.	90,000 00
Nov. 1, 1907,	.	.	.	.	4s	.	.	.	.	22,000 00
July 1, 1908,	.	.	.	.	4s	.	.	.	.	46,000 00
Aug. 1, 1908,	.	.	.	.	4s	.	.	.	.	25,000 00
July 1, 1909,	.	.	.	.	4s	.	.	.	.	20,000 00
May 1, 1910,	.	.	.	.	4s	.	.	.	.	288,000 00
July 1, 1910,	.	.	.	.	4s	.	.	.	.	75,000 00
Sept. 1, 1910,	.	.	.	.	4s	.	.	.	.	125,000 00
Jan. 1, 1911,	.	.	.	.	4s	.	.	.	.	20,000 00
Oct. 1, 1911,	.	.	.	.	4s	.	.	.	.	35,000 00
Jan. 1, 1912,	.	.	.	.	4s	.	.	.	.	150,000 00
May 2, 1912,	.	.	.	.	4s	.	.	.	.	75,000 00
Nov. 1, 1912,	.	.	.	.	4s	.	.	.	.	45,000 00
Feb. 1, 1913,	.	.	.	.	4s	.	.	.	.	100,000 00
Aug. 1, 1913,	.	.	.	.	4s	.	.	.	.	50,000 00
Apr. 1, 1915,	.	.	.	.	4s	.	.	.	.	200,000 00
Aug. 1, 1915,	.	.	.	.	4s	.	.	.	.	200,000 00

Aug	1874	6	100,000 (fr)
Jan	1875	6	200,000 (fr)
Aug	1875	6	100,000 (fr)
Jan	1876	6	200,000 (fr)
Aug	"	11 25	200,000 (fr)
Jan	"	21 25	100,000 (fr)
Aug	"	11 25	75,000 (fr)
Jan	"	11 25	100,000 (fr)
Aug	"	11 25	50,000 (fr)
Jan	"	11 25	100,000 (fr)
Aug	"	11 25	50,000 (fr)
Jan	"	11 25	25,000 (fr)
Aug	"	6	100,000 (fr)
			8,572,100 (fr)

Annual Report . .

P149487

THE WATER BOARD

City of Cambridge

MASSACHUSETTS

City of Cambridge
Massachusetts

ANNUAL REPORT

THE WATER BOARD

1911

PRINTED BY THE CITY OF CAMBRIDGE

RECEIVED AT THE CITY OF CAMBRIDGE

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-1901.

CHESTER W. KINGSLEY . . .	1865-1894	
JOHN SARGENT	1865-1871	
A. K. P. WELCH	1865-1871	
ROBERT DOUGLASS	1865-1871	
SAMUEL SLOCOMB	1865-1876	
Z. L. RAYMOND	1871	
HENRY L. EUSTIS	1871-1885	
J. WARREN MERRILL . . .	1871-1881	
GEORGE P. CARTER	1871-1883	
JOHN H. LEIGHTON	1876-1879	
KNOWLTON S. CHAFFEE . .	1879-1889	
JAMES M. W. HALL	1881-1899	
LEANDER M. HANNUM . . .	(1883-1884	
	(1885-1893	
JOHN F. O'BRIEN	1884-1895	
GEORGE H. HOWARD	1889-	(Now in Off
E. BURT PHILLIPS	1893-1896	
STILLMAN F. KELLEY . . .	1894-	(Now in Off
FRANK A. ALLEN	1895-1899	
WELLINGTON FILLMORE . .	1896-	(Now in Off
EDMUND H. STEVENS	1899-	(Now in Off
WILLIAM B. DURANT	1899-	(Now in Off

Presidents of the Board.

J. WARREN MERRILL	1865-1867
EZRA PARMENTER	1867
JOHN SARGENT	1867-1871
J. WARREN MERRILL	1871-1873
CHESTER W. KINGSLEY . . .	1873-1876
GEORGE P. CARTER	1876-1883
CHESTER W. KINGSLEY . . .	1883-1894
JAMES M. W. HALL	1894-1899
WILLIAM B. DURANT	1899-

REPORT OF THE COMMISSIONER WATER BOARD

[illegible]

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

WATER BURY, CONN., MAY 11, 1907.

[illegible]

1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator, who is usually a member of the research team. The investigator will identify the problem by looking at the data and trying to find out what is going on.

2. The second step is to develop a hypothesis. This is a statement that the investigator believes is true. It is usually based on the data that the investigator has seen.

3. The third step is to design an experiment. This is a plan that the investigator will use to test the hypothesis. It usually involves a series of steps that the investigator will follow.

4. The fourth step is to conduct the experiment. This is where the investigator actually does the experiment. They will follow the steps that they designed in the previous step.

5. The fifth step is to analyze the data. This is where the investigator looks at the results of the experiment and tries to figure out what they mean.

6. The sixth step is to draw a conclusion. This is where the investigator decides whether or not the hypothesis was supported by the data.

7. The seventh step is to write a report. This is where the investigator writes up what they did and what they found.

8. The eighth step is to present the results. This is where the investigator shows their results to other people.

9. The ninth step is to discuss the results. This is where the investigator talks about what they think the results mean.

10. The tenth step is to publish the results. This is where the investigator puts their results in a journal or other publication.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840.

1. The first group of people who are interested in the results of the study are the researchers themselves. They want to know if the study was successful in achieving its goals and if the data collected is reliable and valid.

WATER BOARD.

WATER BOND ACCOUNT.

| | |
|---|----------------|
| The whole amount of bonds outstanding is | \$3,302,100 00 |
| Deducting from this sum the present value of the Water Debt Sinking Fund (not including the note of the City for \$200,000, which the Trustees of the Sinking Fund designated in their report of 1898, as the "Contingent Loan Obligation of the City of Cambridge," and which they omitted to mention in their report of 1899) | \$604,326 58 |
| Leaves as the net Water Debt | \$2,697,773 42 |

| | |
|--|-------------|
| Further details of the financial operations of the department will be found in the statement of the Registrar which accompanies this report. From that statement it will appear that the excess of receipts over expenditures during the past year is the sum of | \$14,332 11 |
| The year 1899 closed with a small deficit of | \$240 27 |
| The deficit of the year 1898 was | 3,526 22 |
| Total deficit to date | \$3,766 49 |

Of which \$240.27 is due the City Treasury and \$3,526.22 is due the Water Works on Construction account.

| | |
|---|-------------|
| Deducting these sums | \$3,766 49 |
| Leaves as the net surplus on hand | \$10,565 62 |

FRESH POND.

During the year the Board sent in a communication to the City Council stating that there would be a "surplus of receipts over expenditures," and asking for an appropriation for the purpose of completing a portion of the unfinished work around Fresh Pond. The portion referred to is a part of the original plan of 1897, and is an addition to the driveway around Fresh Pond. It begins at the driveway near the fountain at the gate house, ascending the hill, at an easy grade, to Huron Avenue, until an elevation of sixty-five feet above the City base is reached, and then, leaving Huron Avenue, sweeps around a curve in the shape of an irregular ellipse, from parts of which an extensive and beautiful view of the pond appears through the shrubbery, and then returns to Huron Avenue. The borders of Fresh Pond are among the most attractive features of our Park System, although under care of the Water Board, and, of the many thousands who visit them, it is probable that no one regrets the expenditure of the funds necessary to beautify and adorn them; nor would any one regret such expenditure even if the money were raised by taxation, much less when the expenditure can be met, as in this case from surplus receipts. The Board regret that the City Council did not see fit to make the appropriation, which the Board requested, and trust that their recommendation, which they now renew,

of the last annual report of the Board events have shown that this statement is capable of demonstration. The following table shows the average daily consumption *per capita* in Cambridge during the past ten years :

| | | | | | | | |
|------|---|---|---|---|---|---|----------------|
| 1891 | . | . | . | . | . | . | 64.71 gallons. |
| 1892 | . | . | . | . | . | . | 66. " |
| 1893 | . | . | . | . | . | . | 74.50 " |
| 1894 | . | . | . | . | . | . | 69.19 " |
| 1895 | . | . | . | . | . | . | 71.65 " |
| 1896 | . | . | . | . | . | . | 75.90 " |
| 1897 | . | . | . | . | . | . | 76.46 " |
| 1898 | . | . | . | . | . | . | 85.69 " |
| 1899 | . | . | . | . | . | . | 87.16 " |
| 1900 | . | . | . | . | . | . | 78.69 " |

From this table it appears that, almost without exception, there has been a steady increase in consumption *per capita* from year to year, until we reach the year 1900. During that year the Board has set 270 meters, making the total number in use now 860, as compared with 619 in 1899, an addition of nearly one-third. In 1898, only 447 meters were in use, so that in the last two years the Board has nearly doubled the number of meters. The influence of these meters, few as they are, has been a striking object lesson. Nothing else can account for the decrease in consumption of 8.47 gallons *per capita* between 1899 and 1900. If, therefore, these few meters have reduced consumption to such an extent, it is plain, even without citing the experience of other cities, that a larger number of meters would still further reduce consumption, and thereby necessarily prolong the life of the system for many years. According to the latest report of the State Board of Health, there are eighty-two towns and cities in the Commonwealth which keep a record of their consumption of water. Some of these cities and towns use meters, others not, but the average daily consumption *per capita* of these eighty-two municipalities was, in 1899, only forty-nine gallons. The Metropolitan district, substantially unmetered, is included in this list. It is therefore a very conservative estimate which fixes the probable daily consumption of Cambridge, under a complete meter system, at forty-five gallons *per capita*. The experience of the Board in setting and taking readings from the meters, proves conclusively that the excess of consumption is almost wholly waste, caused by carelessness, or leaky water fixtures, and we have no reason to believe that any water taker will stint himself in the legitimate use of water merely because he takes it through a meter. In view of the fact that it

to pay any rent charges, and there seems to be no justice in such a charge. If the charge is made at all, the amount should be paid into the Sinking Fund of the Water Works, rather than into the City Treasury.

The earlier statutes of the Commonwealth directed that all the surplus of the water receipts, after payment of expenses of maintenance, should be paid into the Sinking Fund of the Water Works. The sum now required to be paid into the Sinking Fund, in addition to interest, is $3\frac{1}{2}$ per cent. of the face value of the outstanding water bonds. If there is anything left, after these payments, and payment of the expenses of maintenance, and the surplus or any part of it is paid into the City Treasury, instead of into the Sinking Fund, under color of charges to the Water Board which are not legitimate, it is obvious that the general tax payers profit at the expense of the water takers. But many water takers are not tax payers, and large tax payers often pay no more water rates than small tax payers, and so an obvious injustice is done. The only equitable distribution of surplus receipts, after providing for the maintenance of the works, is by reducing water rates, as soon as the amount of the surplus justifies that course.

The possibility of a large issue of bonds, for the purpose of laying a new conduit, requiring larger interest and sinking fund payments, renders it unwise, however, to expect or anticipate any further reduction in water rates at present.

Respectfully submitted,

| | | |
|----------------------|---|------------------|
| WILLIAM B. DURANT, | } | <i>Cambridge</i> |
| GEORGE H. HOWARD, | | |
| STILLMAN F. KELLEY, | | |
| WELLINGTON FILLMORE, | | |
| EDMUND H. STEVENS, | | |
| | | <i>Water</i> |
| | | <i>Board.</i> |

REPORT OF THE WATER RESISTANCE

WASH. DIST. COUNCIL OF CHURCHES.

1. What is the purpose of the document?

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971) using a Shimadzu 1601 UV-Visible Spectrophotometer. The concentration of chlorophyll was expressed in $\mu\text{g mL}^{-1}$.

[illegible]

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

A

B

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...and the fact that the *Journal* is a journal of the American Psychological Association, the largest and most influential organization in the field of psychology, adds to the significance of the work.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

[illegible]

1. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Arar and Collins (1971). The *Chlorophyll a* and *Chlorophyll b* contents were expressed as $\mu\text{g g}^{-1}$ of dry weight.

[illegible]

There has been abated :—

| | |
|--|------------|
| Water rates, off and on, and seals | \$4,959 20 |
| Supplies and repairs | 171 42 |

There remains uncollected :—

| | |
|--------------------------------|--------------|
| Water rates | \$141 55 |
| Meter rates | 59 00 |
| Supplies and repairs | 561 71 |
| Off and on | 134 00 |
| Seals | 6 25 |
| Maintenance account | 726 30 |
| Construction account | 76 38 |
| | <hr/> |
| | \$338,939 21 |

EXPENDITURES.

| | |
|--|-------------|
| Construction account (general) | \$16,999 60 |
| Construction account (Fresh Pond Reservoir) | 55 25 |
| Construction account (Hobbs Brook Reservoir) | 2,585 63 |
| Construction account (service of City Solicitor) | 500 00 |
| Maintenance account (general) | 64,186 26 |
| Maintenance account (rent of offices) | 3,200 00 |
| Supply account | 5,739 73 |
| | <hr/> |
| | \$93,266 49 |

ABATEMENTS.

| | |
|--|------------|
| Water rate bills to the amount of | \$4,959 20 |
| Supply and repair bills to the amount of | 171 42 |
| | <hr/> |
| | \$5,130 62 |

REFUNDS.

| | |
|--|--------------|
| Water rates to the amount of | \$2,941 95 |
| Which amount deducted from receipts | 322,421 32 |
| | <hr/> |
| Leaves net receipts for water | \$319,479 37 |
| Add off and on, fines, rents, seals, and Maintenance account | 4,215 73 |
| | <hr/> |
| Makes net receipts of rates, fines, etc. | \$323,695 10 |

OFF AND ON.

Water has been shut off for non-payment of rates, or per order on account of vacancy, and seals have been applied to fixtures by request of owners, as follows : —

| | |
|--|------|
| Water shut off in 1900 | 743 |
| Supplies let on, shut off in 1900 | 606 |
| Supplies let on, shut off in previous years | 84 |
| New supplies let on | 155 |
| Seal locks applied to fixtures in 1900 | 1125 |
| Seal locks removed, put on in 1900 | 553 |
| Seal locks removed, put on in previous years | 518 |

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

| Year | Month | Day | Time | Location | Remarks |
|------|-------|-----|-------|---------------|--------------------------|
| 1912 | Jan | 1 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Jan | 2 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 3 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Jan | 4 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Jan | 5 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Jan | 6 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 7 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Jan | 8 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Jan | 9 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Jan | 10 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 11 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Jan | 12 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Jan | 13 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Jan | 14 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 15 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Jan | 16 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Jan | 17 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Jan | 18 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 19 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Jan | 20 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Jan | 21 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Jan | 22 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 23 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Jan | 24 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Jan | 25 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Jan | 26 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 27 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Jan | 28 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Jan | 29 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Jan | 30 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Jan | 31 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Feb | 1 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Feb | 2 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Feb | 3 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 4 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Feb | 5 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Feb | 6 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Feb | 7 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 8 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Feb | 9 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Feb | 10 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Feb | 11 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 12 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Feb | 13 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Feb | 14 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Feb | 15 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 16 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Feb | 17 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Feb | 18 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Feb | 19 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 20 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Feb | 21 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Feb | 22 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Feb | 23 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 24 | 10:00 | Los Angeles | Left for San Francisco |
| 1912 | Feb | 25 | 10:00 | San Francisco | Arrived at San Francisco |
| 1912 | Feb | 26 | 10:00 | San Francisco | Left for Los Angeles |
| 1912 | Feb | 27 | 10:00 | Los Angeles | Arrived at Los Angeles |
| 1912 | Feb | 28 | 10:00 | Los Angeles | Left for San Diego |
| 1912 | Feb | 29 | 10:00 | San Diego | Arrived at San Diego |
| 1912 | Feb | 30 | 10:00 | San Diego | Left for Los Angeles |
| 1912 | Mar | 1 | 10:00 | Los Angeles | Arrived at Los Angeles |

COMPARATIVE STATEMENT.

| | 1899 | | 1900 | |
|---|--------------|--------------|--------------|--------------|
| CONSTRUCTION ACCOUNT.
(HOBBS BROOK RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | \$13,500 00 | | \$9,500 00 | |
| From sale of grass, feed, old material, etc..... | 65 00 | \$13,565 00 | | \$9,500 00 |
| <i>Expended.</i> | | | | |
| Construction of reservoir, land settlement, etc..... | \$11,874 17 | | \$2,585 65 | |
| Services of City Solicitor | 1,690 83 | | 500 00 | |
| Balance of appropriation..... | | \$13,565 00 | 6,414 35 | \$9,500 00 |
| CONSTRUCTION ACCOUNT.
(FRESH POND LAND.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | \$500 00 | \$500 00 | | |
| <i>Expended.</i> | | | | |
| Settlement for land taken, etc..... | \$415 00 | | | |
| Balance of appropriation..... | 85 00 | \$500 00 | | |
| CONSTRUCTION ACCOUNT.
(FRESH POND RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | | \$1,000 00 | \$500 00 | \$500 00 |
| <i>Expended.</i> | | | | |
| For work at Fresh Pond..... | \$997 92 | | \$55 25 | |
| Balance of appropriation..... | 2 08 | \$1,000 00 | 444 75 | \$500 00 |
| CONSTRUCTION ACCOUNT.
(GENERAL.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued | \$33,500 00 | | \$20,000 00 | |
| From premium on bonds | | | 1,960 80 | |
| From sale of pipe, fittings, etc..... | 1,295 00 | \$34,795 00 | 62 10 | \$22,022 90 |
| <i>Expended.</i> | | | | |
| Sundry bills and pay rolls..... | \$33,364 00 | | \$16,979 60 | |
| Balance of appropriation..... | 1,431 00 | \$34 795 00 | 5 023 30 | \$22,022 90 |
| SUPPLY ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From pipe and labor on supplies .. | | \$6,592 26 | | \$5,404 25 |
| <i>Expended.</i> | | | | |
| Sundry bills for stock and labor... | | 6,346 06 | | 5,739 73 |
| Excess of receipts..... | | \$246 20 | | |
| Expenditures, excess of..... | | | | \$335 48 |
| MAINTENANCE ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From "rates, fines, etc." | \$305,706 75 | | \$320,612 37 | |
| From sale of grass, old materials, etc. | 1,830 09 | | 3,082 73 | |
| Accrued interest on water bonds sold..... | | \$305,536 84 | 61 25 | \$323,756 33 |
| <i>Expended.</i> | | | | |
| Care and repairs..... | \$61,690 81 | | \$64,186 26 | |
| Interest on water debt. | 130,674 90 | | 127,179 00 | |
| Sinking fund requirements..... | 113,718 50 | | 114,523 50 | |
| Rent of offices | | \$306,083 31 | 3,200 00 | \$309,088 76 |
| Deficit in receipts..... | | \$486 47 | | |
| Excess of receipts | | | | \$14,667 59 |

COMPARATIVE STATEMENT.—*Continued.*

| | | |
|---|-------------|-------------|
| 1899 Maintenance account, excess of expenditures..... | \$488 47 | |
| Supply account, excess of receipts..... | 246 20 | |
| Excess of total expenditures over total receipts..... | | \$240 27 |
| 1900 Maintenance account, excess of receipts | \$14,667 59 | |
| Supply account, excess of expenditures..... | 835 48 | |
| Excess of total receipts over total expenditures..... | | \$14,832 11 |

From the excess of receipts shown above, amounting to \$14,332.11, has been deducted the amount of the deficit of the past two years (\$3,766.49), and the balance of excess receipts, \$10,565.62, has been carried to the sinking fund as required by law.

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 19,993 families, 798 stables, 2,964 horses, 178 cows, 286 shops and 626 stores and offices, by the following fixtures, viz:—

| | |
|---------------------|---------------------|
| 23,747 faucets, | 71 urinals, |
| 8,736 wash basins, | 13 yard hydrants, |
| 11,728 wash tubs, | 5 fountains, |
| 7,733 bath tubs, | 31 tumbler washers, |
| 262 slop closets, | 2,167 hand hose, |
| 20,325 pan closets, | 10 motors. |
| 2 hopper closets, | |

Also,

- 968 fire hydrants (beside 19 on private premises).
- 8 fire reservoirs.
- 28 drinking fountains in public squares.
- 59 street watering standpipes.
- 4 public sanitaries.

The above schedule of fixtures does not include those in schoolhouses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made with very satisfactory results.

Respectfully submitted,

WALTER H. HARDING,

Registrar.

COMPARATIVE STATEMENT.

| | 1899 | | 1900 | |
|--|--------------|--------------|--------------|--------------|
| CONSTRUCTION ACCOUNT.
(HOBBS BROOK RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | \$13,500 00 | | \$9,500 00 | |
| From sale of grass, feed, old material, etc..... | 65 00 | \$12,585 00 | | \$9,500 00 |
| | | | | |
| By land | \$11,874 17 | | \$2,585 85 | |
| No | | | 500 00 | |
| By | 1,680 83 | \$13,565 00 | 6,414 35 | \$9,500 00 |
| CONSTRUCTION ACCOUNT.
(FRESH POND LAND.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | \$500 00 | \$500 00 | | |
| <i>Expended.</i> | | | | |
| Settlement for land taken, etc..... | \$415 00 | | | |
| Balance of appropriation..... | 85 00 | \$500 00 | | |
| CONSTRUCTION ACCOUNT.
(FRESH POND RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued | | \$1,000 00 | \$500 00 | \$500 00 |
| <i>Expended.</i> | | | | |
| For work at Fresh Pond..... | \$1007 102 | | \$35 25 | |
| Balance of appropriation..... | 2 08 | \$1,000 00 | 444 75 | \$500 00 |
| CONSTRUCTION ACCOUNT.
(GENERAL.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued | \$33,500 00 | | \$20,000 00 | |
| From premium on bonds | | | 1,980 80 | |
| From sale of pipe, fittings, etc. | 1,205 00 | \$34,795 00 | 02 10 | \$22,022 90 |
| <i>Expended.</i> | | | | |
| Sundry bills and pay rolls..... | \$33,354 00 | | \$16,809 00 | |
| Balance of appropriation..... | 1,431 00 | \$34,795 00 | 5 023 30 | \$22,022 90 |
| SUPPLY ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From pipe and labor on supplies .. | | \$6,602 26 | | \$5,404 25 |
| <i>Expended.</i> | | | | |
| Sundry bills for stock and labor... | | 0,346 06 | | 3,730 73 |
| Excess of receipts..... | | \$246 20 | | |
| Expenditures, excess of | | | | \$338 48 |
| MAINTENANCE ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From "rates, fines, etc." | \$303,766 75 | | \$320,612 87 | |
| From sale of grass, old materials, etc | 1,890 00 | | 3,082 73 | |
| Accrued interest on water bonds sold | | \$305,656 75 | 61 25 | \$323,756 33 |
| <i>Expended.</i> | | | | |
| Care and repairs..... | \$61,520 81 | | \$64,186 26 | |
| Interest on water debt | 130,674 00 | | 127,170 00 | |
| Sinking fund requirements | 113,718 50 | | 114,523 50 | |
| Rent of offices | | | 3,200 00 | |
| | | \$306,903 31 | | \$309,088 76 |
| Deficit in receipts | | \$495 47 | | |
| Excess of receipts | | | | \$14,667 50 |

WORKING STATEMENT (Continued)

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Page 10

1. Name of the respondent: _____

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U.S. DEPARTMENT OF JUSTICE

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... amount of the deficit of the past two years ... \$10,502 62, has been ...

"The Government, however, has been able to supply water to 19,000 families, 700 stables, and 100 shops and offices, by the following means:

1. The first step is to identify the problem or question that needs to be addressed. This involves understanding the context and the specific requirements of the task.

2. Next, it is essential to gather relevant information and data. This can be done through research, consultation with experts, or by analyzing existing resources.

3. Once the information is gathered, the next step is to analyze it. This involves breaking down the problem into smaller, more manageable parts and identifying the key factors that influence the outcome.

4. After analysis, a plan or strategy should be developed. This plan should outline the steps that need to be taken to solve the problem, taking into account the resources available and the potential challenges.

5. The final step is to implement the plan. This involves putting the strategy into action and monitoring the progress. If necessary, adjustments should be made along the way to ensure the best possible outcome.

- 71 urinal.
- 12 yard hydrant.
- 9 fountain.
- 31 tumbler washers.
- 16 hand bar.
- 10 mirror

and the "private" books of 1944, private documents

1. The results are
2. The results are
3. The results are
4. The results are

[illegible]

... ..

10/10/1941

W A I T E R : H I H A R D I N G .

1. Introduction

CITY OF CAMBRIDGE,
OFFICE OF CITY TREASURER,
December 1, 1900.

To the Cambridge Water Board :

GENTLEMEN :— I give you herewith a record of the transactions between the Water Office and the City Treasurer's Office during the year ending November 30, 1900.

| | |
|---|--------------|
| Gross collections for account of Water Works, " Rates, Fines, etc." . | \$328,513 52 |
| Abatement certificates received and paid on " Water Rates " | 4,959 20 |
| Gross collections for account of Water Works, " Supply Account " . | 5,575 67 |
| Abatement certificates received and paid on " Supply Account " . | 171 42 |
| " Refund " certificates have been presented and paid to the amount of | 2,941 95 |
| Uncollected bills in my hands November 30, 1900, for account of | |
| " Maintenance," " Construction " and " Water Rates," amount to . | 1,143 48 |
| Uncollected bills in my hands November 30, 1900, for account of | |
| " Supplies, Repairs, etc.," amount to | 561 71 |
| Gross collections for account of Water Works, " Construction " . | 62 10 |
| Gross collections for account of Water Works, " Maintenance " . | 3,082 78 |

Very respectfully,

WM. W. DALLINGER,
City Treasurer.

I have examined the above statement and find it correct.

HARRY T. UPHAM,
City Auditor.

REPORT OF THE SUPERINTENDENT OF WATER WORKS

Commencing December 1, 1900,

In accordance with the City Ordinance, I herewith submit to the Board of Public Works the report of the Superintendent for the year ending November 30, 1900.

CONSUMPTION

| | |
|---|------------------------|
| Total water pumped during the past year | 2,451,277.240 gallons. |
| Average water pumped during the past year | 7,941,773 " |
| Water pumped for domestic use | 710,612.372 " |
| Water pumped for irrigating streets | 31,142.940 " |
| Water pumped for flushing sewers | 1,230,000 " |
| Water pumped for flushing canals | 7,500,000 " |
| Water pumped for drinking fountains | 5,000,000 " |
| Total | 451,545,172 gallons |
| Water pumped for domestic use | 710,612,372 gallons |

Water pumped for domestic use is a substantial portion of the total amount pumped during the year.

Water pumped for domestic use is a substantial portion of the total amount pumped during the year, including water for private streets, houses, and other purposes.

STATEMENT OF TOTAL PUMPING DURING THE PAST TEN YEARS

| Year | Total Pumping | Domestic Use | Average Pumping | Domestic Use | Domestic Use per Capita |
|------|---------------|--------------|-----------------|--------------|-------------------------|
| 1900 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1899 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1898 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1897 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1896 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1895 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1894 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1893 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1892 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |
| 1891 | 2,451,277.240 | 710,612.372 | 7,941,773 | 710,612.372 | 44.71 |

COMPARATIVE STATEMENT OF DOMESTIC PUMPING DURING THE PAST
TEN YEARS.

| Date. | Domestic
Yearly
Pumping. | Increase or Decrease | Average
Daily
Pumping. | Increase or
Decrease. | Gallons to
each inhabit-
ant daily. |
|--|--------------------------------|----------------------|------------------------------|--------------------------|---|
| Total amount of coal consumed (in pounds) | | | | | 3,866,975 |
| Daily average coal consumed (in pounds) | | | | | 10,594 |
| Coal consumed per million gallons pumped | | | | | 1,458 |
| Highest water elevation in Fresh Pond was on April 23 | | | | | 17.46 |
| Lowest water elevation in Fresh Pond was on September 16 | | | | | 13.96 |
| Average height of water in Fresh Pond | | | | | 15.47 |
| Highest water elevation in Stony Brook Reservoir was on March 2 | | | | | 82.81 |
| Lowest water elevation in Stony Brook Reservoir was on July 9 | | | | | 77.04 |
| Highest water elevation in Hobbs Brook Reservoir No. 1, Lincoln Street, was on March 17 | | | | | 182.08 |
| Lowest water elevation in Hobbs Brook Reservoir No. 1, Lincoln Street, was on September 13 | | | | | 179.68 |
| Highest water elevation in Hobbs Brook Reservoir No. 2, Winter Street, was on March 17 | | | | | 181.85 |
| Lowest water elevation in Hobbs Brook Reservoir No. 2, Winter Street, was on January 10 | | | | | 175.10 |
| Total rainfall at Fresh Pond Pumping Station | | | | | 46.89 |
| Total rainfall at Stony Brook Reservoir | | | | | 51.34 |
| Total rainfall at Hobbs Brook Reservoir | | | | | 45.89 |

TOTAL RAINFALL FOR THE PAST TEN YEARS.

| Month | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | In. | In. | In. | In. | In. | In. | In. | In. | In. | In. |
| December | 4.40 | 6.79 | 1.23 | 5.23 | 4.43 | 1.90 | 1.68 | 4.31 | 2. | 1.80 |
| January | 6.68 | 4.32 | 1.87 | 3.05 | 3.57 | 2.46 | 3.32 | 4.75 | 5.35 | 4.60 |
| February | 4.61 | 2.46 | 6.43 | 2.91 | 1.07 | 6.62 | 2.36 | 3.61 | 5.89 | 7.34 |
| March | 6.74 | 3.56 | 2.50 | .84 | 2.68 | 4.87 | 2.66 | 2.08 | 5.94 | 5.10 |
| April | 2.72 | .77 | 3.25 | 2.94 | 4.15 | 1.70 | 2.82 | 6.22 | 1.22 | 1.90 |
| May | 2.44 | 6.06 | 7.30 | 4.63 | 2.39 | 2.42 | 4.24 | 3.92 | .77 | 5.52 |
| June | 4.01 | 4.28 | 2.18 | .81 | 2.76 | 2.83 | 5.16 | 1.83 | 5.17 | 2.75 |
| July | 3.06 | 2.53 | 2.26 | 2.86 | 3.29 | 2.65 | 4.68 | 4.50 | 3.12 | 3.31 |
| August | 3.68 | 6.11 | 5.95 | 1.03 | 4.71 | 2.41 | 5.06 | 7.84 | 3.31 | 2.80 |
| September | 2.78 | 1.84 | 1.76 | 2.40 | 1.83 | 6.29 | 3.22 | 1.78 | 4.62 | 4.40 |
| October | 5.10 | 2.16 | 3.77 | 5.19 | 10.16 | 3.10 | .55 | 7.23 | 3.08 | 3.75 |
| November | 3.08 | 4.04 | 1.99 | 3.34 | 6.06 | 3.63 | 6.83 | 4.93 | 2.30 | 5.23 |
| Total | 42.25 | 44.85 | 40.49 | 35.85 | 47.12 | 38.82 | 42.53 | 53.42 | 37.88 | 46.89 |

... ..

[illegible][illegible]

1997

[illegible]

1. **Introduction**
 2. **Background**
 3. **Methodology**
 4. **Results**
 5. **Discussion**
 6. **Conclusion**
 7. **References**

...the fact that the *Journal of the American Medical Association* is the only journal in the field to have a dedicated section for the publication of research on the use of complementary and alternative medicine. The *Journal of the American Medical Association* is the only journal in the field to have a dedicated section for the publication of research on the use of complementary and alternative medicine.

11. *Chlorophyll a* and *Chlorophyll b* were determined by the method of Lichtenthaler and Whistler (1973). The total chlorophyll content was determined by the method of Arar and Johnson (1977). The carotenoid content was determined by the method of Lichtenthaler and Whistler (1973). The total phenolic content was determined by the method of Singleton and Rossi (1965). The total flavonoid content was determined by the method of Zhishen et al. (1999). The total protein content was determined by the method of Lowry et al. (1951). The total lipid content was determined by the method of Folch et al. (1957). The total carbohydrate content was determined by the method of Dubois and Gilles (1950). The total ash content was determined by the method of AOAC (1990). The total acid content was determined by the method of AOAC (1990). The total base content was determined by the method of AOAC (1990). The total nitrogen content was determined by the method of Kjeldahl (1900). The total phosphorus content was determined by the method of Molybdenum blue (1900). The total sulfur content was determined by the method of Barium sulfate (1900). The total calcium content was determined by the method of Oxalate (1900). The total magnesium content was determined by the method of Magnesia (1900). The total potassium content was determined by the method of Potassium dichromate (1900). The total sodium content was determined by the method of Sodium chloride (1900). The total iron content was determined by the method of Iron(III) chloride (1900). The total copper content was determined by the method of Copper(II) sulfate (1900). The total zinc content was determined by the method of Zinc sulfate (1900). The total manganese content was determined by the method of Manganese sulfate (1900). The total cobalt content was determined by the method of Cobalt(II) chloride (1900). The total nickel content was determined by the method of Nickel(II) sulfate (1900). The total chromium content was determined by the method of Chromium(III) chloride (1900). The total boron content was determined by the method of Boric acid (1900). The total molybdenum content was determined by the method of Molybdenum trioxide (1900). The total selenium content was determined by the method of Selenium dioxide (1900). The total tellurium content was determined by the method of Telluric acid (1900). The total iodine content was determined by the method of Iodine (1900). The total bromine content was determined by the method of Bromine (1900). The total fluorine content was determined by the method of Hydrofluoric acid (1900). The total chlorine content was determined by the method of Hydrochloric acid (1900). The total oxygen content was determined by the method of Oxygen (1900). The total hydrogen content was determined by the method of Hydrogen (1900). The total carbon content was determined by the method of Carbon (1900). The total nitrogen content was determined by the method of Nitrogen (1900). The total phosphorus content was determined by the method of Phosphorus (1900). The total sulfur content was determined by the method of Sulfur (1900). The total calcium content was determined by the method of Calcium (1900). The total magnesium content was determined by the method of Magnesium (1900). The total potassium content was determined by the method of Potassium (1900). The total sodium content was determined by the method of Sodium (1900). The total iron content was determined by the method of Iron (1900). The total copper content was determined by the method of Copper (1900). The total zinc content was determined by the method of Zinc (1900). The total manganese content was determined by the method of Manganese (1900). The total cobalt content was determined by the method of Cobalt (1900). The total nickel content was determined by the method of Nickel (1900). The total chromium content was determined by the method of Chromium (1900). The total boron content was determined by the method of Boron (1900). The total molybdenum content was determined by the method of Molybdenum (1900). The total selenium content was determined by the method of Selenium (1900). The total tellurium content was determined by the method of Tellurium (1900). The total iodine content was determined by the method of Iodine (1900). The total bromine content was determined by the method of Bromine (1900). The total fluorine content was determined by the method of Fluorine (1900). The total chlorine content was determined by the method of Chlorine (1900). The total oxygen content was determined by the method of Oxygen (1900). The total hydrogen content was determined by the method of Hydrogen (1900). The total carbon content was determined by the method of Carbon (1900).

1. The first group of people who are not in the labor force are those who are not in the labor force because they are not in the labor force. This group is the largest group of people who are not in the labor force.

PUMPING STATION AND GROUNDS.

Engine No. 7 has had some slight repairs during the year and coils have been put into the second receiver in place of the tubes which were giving trouble from leaking. The machinery at the Station is in good condition and is performing very satisfactorily.

On November 14th the forty-inch to thirty-six inch flange reducer on the pumping main near the pumping Station broke at the flange; this necessitated pumping direct, with the Worthington and Blake engines, while repairs were being made.

The coal shed, two of the dwelling houses and the stable have been painted. The grounds have received the usual care and are in fair condition.

HIGHLAND STREET RESERVOIR.

The property remains in the same condition as at the last report. The grass on the banks has been cut and the walks cared for.

PAYSON PARK RESERVOIR.

The strainers on the outlet pipes from both basins, which were broken by the anchor ice last winter, have been replaced with copper ones and both basins cleaned out.

The twelve-inch pipe drain connected with the under-drains and mud-pipes has been extended about five hundred (500) feet through the land of the Hittinger Fruit Company. The banks and walks have received the usual care.

PIPE YARD.

The buildings at the pipe yard are in good condition, but will need painting the coming year.

PIPE BRIDGES.

The two twelve-inch lines of pipe across the new bridge over the Fitchburg Railroad at Massachusetts Avenue have been put in, connecting with the sixteen-inch main in Massachusetts Avenue on the north side of the bridge, and the ten-inch line on the south side.

HIGH SERVICE.

No extension has been made on the high service system during the year.

Following will be found a list of the streets that are at date supplied by the high service, November 30, 1900.

The special inspection, instituted last year for the detection of leaks has been continued with the above satisfactory results.

As in former years, the usual notice has been sent to the owners or occupant of premises where the waste has been discovered and the defects have been promptly attended to.

Twenty-five hundred seven (2,507) were found on the premises :—of these twenty-four hundred ninety-six (2,496) were reported by the inspectors.

One hundred thirty-one (131) were found in the streets :—

Three (3) on four-inch mains.

Three (3) on six-inch mains.

One (1) on eight-inch main.

Five (5) on ten-inch main.

Two (2) on twelve-inch mains.

One (1) on forty-inch main.

One (1) on forty by thirty-six inch reducer in gate chamber at Pumping Station.

One (1) on hydrant.

One (1) on fountain.

The leak on the forty-inch main is the first that has occurred on our forty-inch steel main :—it was located in the branch for the regulator valves on Huron Avenue.

The leak in the gate chamber just outside of the Pumping Station necessitated a change in the system of pumping and for seven days the City was supplied by pumping direct.

Ten (10) leaks have been caused by electrolysis this year :—the expense of the repairs has been charged to the Boston Elevated Railway Company as per agreement.

TABLE SHOWING A GAIN OR LOSS IN TOTAL CONSUMPTION FOR THE YEAR 1900 OVER THE YEAR 1899.

| | Total Consump-
tion 1900. | Total Consump-
tion 1899. | Increase or
Decrease, + or —. |
|----------------|------------------------------|------------------------------|----------------------------------|
| December | 204,553,360 | 250,320,840 | —45,767,480 |
| January | 243,173,020 | 265,448,480 | —22,274,560 |
| February..... | 199,942,120 | 269,707,680 | —69,765,560 |
| March..... | 229,562,080 | 233,806,320 | — 4,244,240 |
| April..... | 201,539,360 | 211,354,880 | — 9,815,520 |
| May..... | 195,051,120 | 239,712,880 | —44,661,760 |
| June..... | 225,405,400 | 259,134,040 | —33,728,640 |
| July..... | 274,256,400 | 278,324,200 | — 4,067,800 |
| August..... | 226,855,640 | 242,280,280 | —15,424,640 |
| September..... | 224,104,760 | 220,769,400 | — 2,664,640 |
| October..... | 224,248,580 | 210,751,390 | +13,497,190 |
| November..... | 202,584,500 | 194,980,040 | + 7,604,460 |
| Total..... | 2,631,277,240 | 2,882,570,430 | —231,293,190 |

W I : \ P I I I :

The wall on the north side of the room is 11.50 feet of masonry. The wall on the south side of the room is 11.50 feet of masonry. The wall on the east side of the room is 11.50 feet of masonry. The wall on the west side of the room is 11.50 feet of masonry. The wall on the north side of the room is 11.50 feet of masonry. The wall on the south side of the room is 11.50 feet of masonry. The wall on the east side of the room is 11.50 feet of masonry. The wall on the west side of the room is 11.50 feet of masonry.

at a paper formerly located on Franklin Street
near the Franklin Bridge, has been moved to
Franklin Street, Waverly Street and on Waverly
Street. The paper was removed from
Franklin Street.

The new Main Seattle Avenue, west to Pine Street
 will be paved with concrete and connected the High Pacific
 Street with a new eight-inch main. The new line will
 be in place by the time the city has made some for

The first of these is the fact that the
 second of these is the fact that the
 third of these is the fact that the
 fourth of these is the fact that the
 fifth of these is the fact that the
 sixth of these is the fact that the
 seventh of these is the fact that the
 eighth of these is the fact that the
 ninth of these is the fact that the
 tenth of these is the fact that the

1. The first step in the process of identifying a problem is to recognize that a problem exists. This involves gathering information about the situation and identifying the specific issue that needs to be addressed.

1. The first of these is the fact that the majority of the population of the United States is now living in urban areas. This is a result of the process of urbanization, which has been going on since the beginning of the 20th century. The population of the United States has increased from about 100 million in 1900 to over 200 million in 1950, and the majority of this increase has been in urban areas. This has led to a concentration of population in a few large cities, which has in turn led to a number of problems, such as overcrowding, pollution, and traffic congestion.

1. 1990年12月15日，在“九七”香港回归前，香港各界人士纷纷发表文章，讨论香港回归后的前途。其中，有人提出“一国两制”是香港回归后的最佳方案。

1. The first step in the process of identifying a problem is to recognize that a problem exists. This involves gathering information about the situation and identifying the specific issue that needs to be addressed.

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The size, length and weight of main cast-iron pipe laid during the year are as follows:—

| Size. | Length in Feet. | Weight in Tons. |
|---------|-----------------|-----------------|
| 18-inch | 1,496½ | 39.56 |
| 12-inch | 1,656 | 64.31 |
| 10-inch | 1,249 | 47.18 |
| 8-inch | 2,182 | 46.75 |
| 6-inch | 2,623 | 29.80 |
| 4-inch | 891 | 7.80 |

All the hydrants and blow-offs were thoroughly blown off during the months of May and June and the same course will be pursued if possible during the coming months this winter. At the same time all main pipes throughout the City were carefully tested for leakage.

MAIN PIPE LAID, NUMBERS OF GATES AND FIRE HYDRANTS.

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SUPPLIES.

Following is the list of establishments having fire supplies from the City of Cambridge :

| | | |
|--|--------------------------|--------------------------|
| American Rubber Co., | Binney street, | Two 6-in. |
| American Net & Twine Co., | Third street, | 6-in. |
| Barber Asphalt Paving Co., | First street, | 6-in. |
| Bay State Metal Works, | Harvard street, | 6-in. |
| Blacker & Shepard, | Osborn street, | 2-in. |
| Blake, Geo. F. Manufacturing Co., | Third street, | 4-in. |
| Boston Book Binding Co., | Mt. Auburn street, | 6-in. |
| Boston Elevated Railway Co., | Baldwin street, | 2-in. & 4-in. |
| " " " " | Cambridge street, | Two 2-in. |
| " " " " | Pelham street, | 3-4-in. |
| " " " " | Massachusetts ave., | 4-in. |
| " " " " | Mt. Auburn street, | 2-in. & 4-in. |
| " " " " | Murray street, | 4-in. |
| " " " " | River street, | 4-in. |
| Boston & Maine Railroad Co., | Bridge street, | 4-in. |
| " " " " | Bridge street, | 6-in. |
| " " " " | Prison Point street, | 4-in. |
| Boston Woven Hose & Rubber Co., | Portland street, | 10-in. & 8-in |
| Chelmsford Foundry Co., | Portland street, | 2-in. |
| Davis, Curtis & Co., | Broadway, | 6-in. |
| Davis, James C. & Co., | Broadway, | 4-in. & 6-in. |
| Dover Stamping Co., | Pleasant street, | 6-in. |
| Dow, John C. & Co., | Portland street, | 2-in. |
| Fogarty & Daly, | Massachusetts ave., | 4-in. |
| Ginn & Co., | First street, | { Two 6-in.
One 8-in. |
| Goepper Bros., | Ninth street, | 1 1-2-in. |
| Harvard College, Memorial Hall, | Cambridge street, | 4-in. |
| Harvard College, Observatory, | Concord avenue, | 1-in. |
| Holy Ghost Hospital for Incurables, | Hovey avenue, | 3-in. |
| Houghton, Mifflin & Co., | Albro & Blackstone sts., | Two 6-in. |
| Irving & Casson, | First street, | } Two 6-in. |
| " " " " | Otis street, | |
| " " " " | Thorndike street, | |
| " " " " | Thorndike street, | |
| Ivers & Pond Piano Co., | Albany street, | 4-in. |
| Jones, C. L. & Co., | Pearl street, | 4-in. |
| Keeler & Co., | Thorndike street, | 1-in. |
| Kendall, Edward & Sons, | Main street, | 2-in. |
| Lamb & Ritchie, | Albany street, | 6-in. |
| Laminer Fibre Co., | Tannery street, | 2-in. |
| Liquid Air, Power & Automobile Co., | Albany street, | 4-in. |
| Lockhart, William L., | Bridge street, | 1 1-2-in. |
| Luke, E. H. Estate of, | Main street, | 2-in. |
| Mason & Hamlin Co., | Broadway, | 6-in. |
| Massachusetts Athletic Association, | Lausdowne street, | 4-in. |
| Metropolitan Storage Warehouse Co., | Massachusetts avenue, | 6-in. |
| Middlesex County, House of Correction, | Second & Springs sts., | 6-in. |
| Morss & Whyte, | Auburn street, | 3-in. |
| " " " " | Auburn street, | 6-in. |

| | |
|--------------------|-------------|
| Franklin street, | 4 in |
| Franklin street, | 6 in |
| Green street, | 6 in |
| Waller street, | 6 in |
| Hampden street, | 6 in & 6 in |
| at Main street, | 6 in |
| Washington street, | 2 in |
| Richard street, | 6 in |
| Water street, | 6 in |
| Water street, | 6 in |
| Putnam avenue, | 6 in |
| Thompson street, | 6 in |
| Third street, | 6 in |
| First street, | 6 in |
| Highway, | 2 in |
| Main street, | 2 in |
| Hampden street, | 6 in |
| Lyons street, | 6 in |
| South street, | 6 in |
| First street, | 6 in |
| Highway, | 6 in |
| Highway, | 6 in |
| London street, | 6 in |
| Washington street, | 6 in |

STREETS

The following is a list of streets and highways in the District of Columbia, showing the number of feet of pavement laid during the year 1900. The list is arranged in alphabetical order of the name of the street. The figures in parentheses show the number of feet of pavement laid for new buildings, and the figures in brackets show the number of feet of pavement laid for other purposes.

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connected with our system. This firm formerly used salt water for fire purposes.

During the annual spring inspection of sidewalk shut offs the service boxes were lowered where they had been affected by the frost.

Special attention has been directed to those in the following streets where they have been raised :—Arnold Circle, Berkshire Street, Brookline Street, Charles River Road, Fairfield Street, Gray Street, Hastings Street, Hayes Court, Munroe Street, Myrtle Avenue, Ninth Street, Pemberton Street, Porter Circle, Potter Park, Porter Road, Putnam Court, Richdale Avenue, Saint Paul Street, Sidney Street and Tremont Street.

And in the locations following where they have been lowered :—Berkshire Street, Brewster Street, Clarendon Avenue, Distillhouse Street, Eighth Street, Fourth Street, Haskell Street, Hubbard Avenue, Magnolia Avenue, Mill Street, Railroad Street, Third and Otis Streets, Van Norden Street, Willow Street, Worcester Street.

Seventeen (17) service boxes have been reset, and six (6) removed from supplies to be abandoned.

DRINKING FOUNTAINS.

No change in the number of drinking fountains has been made this year. The number in use is twenty-eight (28) — twenty-four (24) of the ordinary style and four (4) ice water drinking fountains of Jenks manufacture.

The ice water drinking fountains were not in use until July : in the two years preceding they had been in commission about the middle of May.

The Water Board considered that having purchased, set and maintained these ice water fountains for two years it should be relieved of further expense of ice maintenance, and having made and asked for no appropriation for this year's expense, the fountains were not supplied with ice until July as before stated and then at the request of the Mayor.

The bills for this ice have not been settled although an appropriation of four hundred dollars (\$400.00) was asked for and ignored by the City Council. It will be necessary to include this amount in the coming year's estimate.

The fountains located as follows have been repaired :—Central Square, Fresh Pond, Garden Street, Lechmere Square, Inman Square, Norton Square, Porter's Square, Putnam Square.

The supplies for the fountain in Central Square and Garden Street have been renewed.

STREET WALKING: SAMPLES

There is no water available in the street watering canisters.

There is a possibility that the necessity of renewing the valves in the main line would have been anticipated. These valves had been raised by the Army Corps of Engineers in 1958. The State Department, the cost of repairs was not estimated at that time.

1. The building is at the corner of Union and Avenue and Madison Street
2. The building is at the corner of Union and Avenue and Madison Street

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1. The first of these is the fact that the majority of the population is of African descent, and that the majority of the population is of African descent.

1. The first of these is the fact that the Government has not been able to secure the necessary funds to carry out its policy. This is due to the fact that the Government has not been able to secure the necessary funds to carry out its policy.

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1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator who is responsible for the study. The investigator must first identify the problem that is being studied. This is done by the investigator who is responsible for the study. The investigator must first identify the problem that is being studied.

• When the A-100 was first introduced in 1962, the
"A-100" was the only aircraft in the world.

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100-443887-1

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

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2. The second part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

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9. The ninth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

10. The tenth part of the document is a list of names and addresses, which appears to be a directory or a list of contacts. The names are written in a cursive script, and the addresses are listed below them.

[illegible][illegible]

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific information required.

(8) lowered to conform to the new surface elevation of the streets as constructed by the Street Department.

Five (5) blow offs and five (5) gate boxes have been reset : one (1) gate box and nine (9) meter boxes have been removed.

HYDRANTS.

Twenty-three (23) hydrants have been added to the list this year: the total number set to date, November 30th, is nine hundred and sixty-eight (968), as follows : —

| | |
|-------------------|-----------|
| Boston | 159 |
| Chapman | 458 |
| Coffin | 42 |
| Flush | 128 |
| Holyoke | 86 |
| Perkins | 95 |
| Total | <hr/> 968 |

Thirty-four (34) post hydrants have been set in the following locations : In Albany Street, east from Pacific, two Chapman ; in Baldwin Street, northeast from Cambridge, one Chapman ; in Bird Street, near Cushing Avenue, one Chapman ; in Cambridge Street, between Fourth and Fifth (Boston removed), one Chapman ; in Dana Street, at Broadway, one Chapman ; in First Street, at Thorndike, one Boston ; in Gorham Street, at Wendell, one Chapman ; in Gray Street, at Linnaean (Chapman removed), one Chapman ; in Green Street, near Putnam Avenue (Flush removed), one Chapman ; in Green Street, southeast from Putnam Avenue, one Chapman ; in Green Street, between Lansdowne and Blanche, one Chapman ; in Harvey Street, opposite Montgomery (Flush removed), one Perkins ; in Magazine Street, at Warland (Flush removed), one Chapman ; in Magee Street, east from Putnam Avenue, one Chapman ; in Massachusetts Avenue, north and south from Amherst Avenue, two Chapman ; in Massachusetts Avenue, north from the Esplanade, two Chapman ; in Massachusetts Avenue, corner Linden Street (Boston removed), one Chapman ; in Massachusetts Avenue, north and south from Princeton Avenue, two Chapman ; in Massachusetts Avenue, south from Vassar, two Chapman ; in Massachusetts Avenue, north and south from Wellesley Avenue, two Chapman ; in Portland Street, corner Vandine (Boston removed), one Chapman ; in Putnam Avenue, southeast from Brookline, one Chapman ; in Putnam Avenue, opposite Magee (Boston removed), one Chapman ; in Putnam Avenue, northwest from Sidney (Flush removed), one Chapman ;

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1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator who is responsible for the study. The investigator must first identify the problem and then determine the scope of the study. The next step is to design the study. This involves determining the methods to be used and the data to be collected. The third step is to collect the data. This is done by the investigator who is responsible for the study. The fourth step is to analyze the data. This is done by the investigator who is responsible for the study. The fifth step is to interpret the results. This is done by the investigator who is responsible for the study. The sixth step is to write the report. This is done by the investigator who is responsible for the study. The seventh step is to present the results. This is done by the investigator who is responsible for the study. The eighth step is to discuss the results. This is done by the investigator who is responsible for the study. The ninth step is to conclude the study. This is done by the investigator who is responsible for the study. The tenth step is to publish the results. This is done by the investigator who is responsible for the study.

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1. The above information was obtained from the Bureau of Census and is not to be used for any other purpose than the one for which it was obtained.

STONY BROOK.

During the year there have been built on the water shed of this Brook nine (9) vaults and five (5) cess-pools, to take care of house drainage; this makes a total of seventeen (17) vaults and (9) cess-pools already built by the City on this Brook. So far, nearly all of them have been cared for by the City. About twenty-two hundred (2,200) feet of fencing have been built on the Sargent place in Lincoln, and about four hundred (400) feet around the upper part of Stony Brook basin.

I would recommend that an appropriation be made for cleaning this Brook and ditching where it is found that the water is held back by accumulations in the present ditches. The buildings at the dam are in good condition. The gate house roof has been repaired and the brick work pointed where needed.

TABLE SHOWING THE DAILY AVERAGE NUMBER OF GALLONS, BY THE MONTH, FLOWING OVER THE WASTE WAY AT STONY BROOK.

| | | Gallons. | Number of Days. | | | Gallons. | Number of Days. |
|-----------|----------|---------------|-----------------|------------|----------|--------------|-----------------|
| December, | 1899.... | No overflow. | — | June, | 1900.... | 114,400,000 | 13 |
| January, | 1900.... | 78,500,000 | 9 | July, | 1900.... | No overflow. | — |
| February, | 1900.... | 1,155,200,000 | 28 | August, | 1900.... | " " | — |
| March, | 1900.... | 1,687,700,000 | 31 | September, | 1900.... | " " | — |
| April, | 1900.... | 568,700,000 | 30 | October, | 1900.... | " " | — |
| May, | 1900.... | 815,900,000 | 31 | November, | 1900.... | 28,700,000 | 3 |

Total quantity wasted, 4,447,100,000 gallons.
Total number of days in which water wasted 145

STONY BROOK PIPE LINE.

The usual inspection of this line, and the gates, air valves, and blow offs has been made. The discharge through this pipe is now about seven (7) million gallons daily, a decrease of about one and one-half million (1,500,000) gallons since it was laid, thirteen (13) years ago.

I would renew the recommendation made for the past two years that something be done to restore this pipe to its former capacity.

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HOBBS BROOK.

The height of water in this basin is now 177.25 feet. Water was drawn from here first this season on August 24th and has continued with slight interruptions to the present. The old ice houses near the upper basin have been torn down and the old material removed.

On the night of November 2nd the old Litchfield house was set on fire and burned, together with the lumber from the old barn which stood near by. The fire was without doubt incendiary. The house and stable occupied by the keeper have been painted.

The standing grass about the basin not needed by the department has been sold.

The brook flowing through the meadows on what was formerly the Litchfield place, and also that coming from the Evans place should be widened and thoroughly cleaned out, and I would advise that the work be done the coming year, as I am confident that it would improve the quality of the water coming from these sources.

RECAPITULATION.

NEW SUPPLIES.

[illegible]

MAIN PIPE.

[illegible]

COMPARATIVE TERMINAL FOR THE LAST TEN YEARS

| Location | Boards | Supplies | Total Feet | Miles |
|----------|----------|----------|------------|----------|
| 1. 1st | 1. 1st | 1. 1st | 1. 1st | 1. 1st |
| 2. 2nd | 2. 2nd | 2. 2nd | 2. 2nd | 2. 2nd |
| 3. 3rd | 3. 3rd | 3. 3rd | 3. 3rd | 3. 3rd |
| 4. 4th | 4. 4th | 4. 4th | 4. 4th | 4. 4th |
| 5. 5th | 5. 5th | 5. 5th | 5. 5th | 5. 5th |
| 6. 6th | 6. 6th | 6. 6th | 6. 6th | 6. 6th |
| 7. 7th | 7. 7th | 7. 7th | 7. 7th | 7. 7th |
| 8. 8th | 8. 8th | 8. 8th | 8. 8th | 8. 8th |
| 9. 9th | 9. 9th | 9. 9th | 9. 9th | 9. 9th |
| 10. 10th | 10. 10th | 10. 10th | 10. 10th | 10. 10th |

It is found the report of the Chief Engineer of the
 Department of Water Works

which is respectfully submitted.

F. C. HENRICKS,
 Superintendent

REPORT OF THE PUMPING ENGINEER

CAMBRIDGE, December 1. 1900.

To the Honorable, the Water Board of the City of Cambridge.

GENTLEMEN :—I will again report that the machinery at the Pumping Station is in first class condition.

The Leavitt engine was run up to October 19th, pumping all the water used by the City the past year to this date, when it was shut down for general repairs. The second receiver was changed from tubes to copper coils on account of leaking. The link boxes were re-enforced with composition and scraped to a bearing; the jacket piping was changed to conform to later ideas in regard to reheating, showing good results with a marked increase in duty.

You will find the duty cut down materially the past year on account of stopping the Leavitt engine seventeen days for repairs and seven days for a leak in the force main outside of the Station, making a difference of one hundred thousand pounds of coal in thirty days' run alone, on account of running the No. 1 and No. 2 Worthington engines.

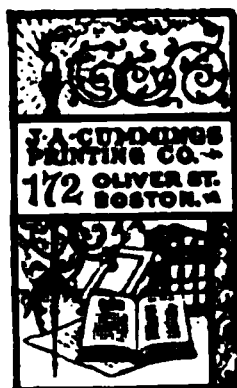
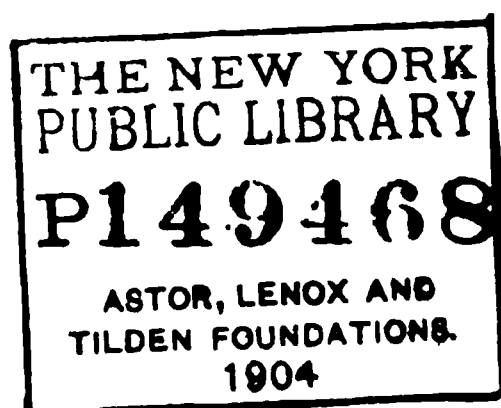
I will again recommend skim coating the No. 1 and No. 2 boilers with magnesia covering, and painting the same, also the steam piping and iron work in the fire-room, to have it compare with the plant in general.

Respectfully submitted,

E. I. HARRIS,
Chief Engineer.

MONTHLY EXPENSES AT PUMPING STATION

| | | | | | |
|--------------|--|--|--|--|-------------|
| Electricity | | | | | \$10,000.00 |
| Oil | | | | | 68.45 |
| Repairs | | | | | 21.41 |
| Supplies | | | | | 12.00 |
| Wages | | | | | 479.69 |
| Travel | | | | | 63.47 |
| Telephone | | | | | 39.15 |
| Postage | | | | | 10.50 |
| Printing | | | | | 277.50 |
| Stationery | | | | | 40.50 |
| Lighting | | | | | 1.34.00 |
| Insurance | | | | | 250.00 |
| Depreciation | | | | | 105.00 |
| Interest | | | | | 8,254.80 |
| Other | | | | | 89.50 |
| Total | | | | | \$19,007.40 |



CAMBRIDGE WATER BOARD

1902

President.

WILLIAM B. DURANT

Members of the Board.

| | |
|-----------------------|--------------------------|
| W. C. KELLEY | Term expires 1902 |
| W. S. FILLMORE | Term expires 1903 |
| W. S. STEVENS | Term expires 1904 |
| W. C. HOWARD | Term expires 1905 |
| W. B. DURANT | Term expires 1906 |

WALTER H. HARDING, Clerk

Superintendent of Works.

EDWIN C. BROOKS

Water Registrar.

WALTER H. HARDING.

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-1901.

| | |
|-------------------------------|--------------------------|
| CHESTER W. KINGSLEY . . . | 1865-1894 |
| JOHN SARGENT | 1865-1871 |
| A. K. P. WELCH | 1865-1871 |
| ROBERT DOUGLASS | 1865-1871 |
| SAMUEL SLOCOMB | 1865-1876 |
| Z. L. RAYMOND | 1871 |
| HENRY L. EUSTIS | 1871-1885 |
| J. WARREN MERRILL | 1871-1881 |
| GEORGE P. CARTER | 1871-1883 |
| JOHN H. LEIGHTON | 1876-1879 |
| KNOWLTON S. CHAFFEE | 1879-1889 |
| JAMES M. W. HALL | 1881-1899 |
| LEANDER M. HANNUM | { 1883-1884
1885-1893 |
| JOHN F. O'BRIEN | 1884-1895 |
| GEORGE H. HOWARD | 1889- (Now in Office |
| E. BURT PHILLIPS | 1893-1896 |
| STILLMAN F. KELLEY | 1894- (Now in Office |
| FRANK A. ALLEN | 1895-1899 |
| WELLINGTON FILLMORE | 1896- (Now in Office |
| EDMUND H. STEVENS | 1899- (Now in Office |
| WILLIAM B. DURANT | 1899- (Now in Office |

Presidents of the Board.

| | |
|-------------------------------|-----------|
| J. WARREN MERRILL | 1865-1867 |
| ERZA PARMENTER | 1867 |
| JOHN SARGENT | 1867-1871 |
| J. WARREN MERRILL | 1871-1873 |
| CHESTER W. KINGSLEY | 1873-1876 |
| GEORGE P. CARTER | 1876-1883 |
| CHESTER W. KINGSLEY | 1883-1894 |
| JAMES M. W. HALL | 1894-1899 |
| WILLIAM B. DURANT | 1899- |

REPORT OF THE CAMBRIDGE WATER BOARD

CAMBRIDGE, December 13, 1901.

Members, the City Council of the City of Cambridge

Your seventh annual report of the Cambridge Water Board, for the year ending November 30, 1901, is herewith submitted for your consideration.

A material change has taken place during the year in the quality of the water supplied by the different reservoirs owned by the Board. The previous high standard of quality has been fully maintained, and the quantity supplied to Fresh Pond, by the aqueduct from Stony Brook, has been adequate to the needs of our present population. It must not be forgotten, however, that during the past two years the consumption has been considerably above the average of previous years.

Great watchfulness and care are therefore required in order to avoid unnecessary waste, if we would avoid the large expenditure of money that is involved in the laying of an additional pipe from Stony Brook.

All the reservoirs of the system, with their surroundings, are in good repair and in excellent sanitary condition, and the buildings, pumping engines and engines are in good order and repair, and fully up to the standard of previous years.

FINANCIAL STATEMENT IN BRIEF

| | |
|--|----------------|
| The cash fund of the Water Works to November 30, 1901, was | \$1,650,720 32 |
| There was expended during the year on construction account | 12,170 71 |
| And the cash fund to November 30, 1902, was | \$1,538,549 61 |

WATER BOARD ACCOUNT

| | |
|---|----------------|
| The balance account of bonds outstanding is | \$1,125,100 00 |
| deducting from this sum the present value of the Water Debt | |
| standing fund exclusive of the note of the City for \$200,000 | 737,731 36 |
| leaves as net Water Debt | \$387,368 64 |

| | |
|---|------------|
| For the balance of the financial condition of the department will be found in the statement of the Registrar annexed to this report from that statement it will appear that the excess of receipts over expenditures during the past year is the sum of | \$2,000 00 |
|---|------------|

During the year the old reservoir, with the land appurtenant to the same, on Highland Street has been surrendered to the heirs of Charles C. Little, according to the condition of the original deed, which provided that in case of disuse the same should revert to said heirs, and the small strips of land adjoining the same, which the City owned absolutely, have been sold to said heirs, and the proceeds of the surrender and sale, namely \$13,278.67 paid into the Water Works Sinking Fund, all by vote of the City Council.

Previous to the surrender and sale, all the pipes and fittings were disconnected, and the ends of the pipes plugged, so that no connection with the old reservoir now exists.

FRESH POND.

In accordance with the recommendation of the Water Board, an appropriation was made by the City Council in March, last, of the sum of \$12,000, out of the surplus receipts of the Water Works, for the purpose of completing a portion of the unfinished work around Fresh Pond. Eleven thousand five hundred dollars of this sum have been expended, under the direction of the Superintendent, in grading and resurfacing a large area of rough and uneven land, on the west side of the Pond adjoining Huron Avenue and near Concord Avenue.

This improvement is very marked, and has called forth many favorable comments from citizens who have had occasion to visit the locality; and, in the opinion of the Board, the money has been well invested. Other places around the Pond are still in need of improvement, and the Board earnestly recommends that the City Council make a further appropriation for the same purpose, for the coming municipal year.

Complaint has been made to the Board, that motor vehicles frequently resort to the driveway around the Pond, to the danger and discomfort of persons who ride and drive thereon, owing to their horses taking fright at the sight of such vehicles.

The Board suggest to the City Council, the passage of an ordinance prohibiting the use of the driveway by motor-vehicles.

On account of the sharp curves in the roadway, such vehicles are much more dangerous there than in any other places, and, as the public parks are for the benefit of all the citizens, the pleasure of a few should

not be allowed to imperil the safety of the vast majority of visitors who are not permitted to ride in motor vehicles.

WATER RISING

On the first day of December, 1900, the water in Hobbs Brook Reservoir was three feet and seven tenths (.37) below high water mark, and Fresh Pond was overflowing the dam, and Fresh Pond was about two feet above high water mark. On the first day of December, 1901, the water in Hobbs Brook Reservoir was one foot and nine inches below high water mark. Fresh Brook was overflowing the dam, and the water in Fresh Pond was about two feet below high water mark, as it was a rising tide. The reservoir at Stony Brook dam, which has necessarily run low since the opening of the River, for the year ending November 30, 1901, contained

6,141,000,000 gallons

The amount of water in the reservoir year was

6,447,100,000 "

The amount of water in the reservoir year of

1,000,000,000 gallons

The amount of water in the past year is more than two years' supply, based on the average annual consumption.

RAIN FALL

The total rain fall for the year at Hobbs Brook was 41.72 inches, at Fresh Pond 40.27 inches, and at Fresh Pond 40.20 inches.

The amount of rain fall at Fresh Pond during the last ten years is as follows:

| | |
|---------|-------|
| 1900 | 41.72 |
| 1901 | 40.27 |
| 1902 | 40.20 |
| 1903 | 41.72 |
| 1904 | 40.27 |
| 1905 | 40.20 |
| 1906 | 41.72 |
| 1907 | 40.27 |
| 1908 | 40.20 |
| 1909 | 41.72 |
| 1910 | 40.27 |
| 1911 | 40.20 |
| Average | 41.72 |

The rain fall of the last two years has been well above the average, and the amount of water in the reservoir is well above the normal level. The amount of water in the reservoir 1902 or 1903

CONSUMPTION OF WATER.

| | |
|--|-----------------------------|
| The total consumption of water for the year ending December 1, 1901, was | 2,785,156,440 gallons. |
| During the year ending December 1, 1900, the total consumption was | 2,651,277,240 " |
| An increase of | <u>133,879,200 gallons.</u> |

During the past year, the pressure of water in the City has been increased about ten pounds, by the adjustment of the regulator valves in the forty-inch distributing main, and this increase of pressure has necessarily increased the total consumption; each opened faucet delivering more water in the same time, and each leak in main or service pipe contributing a larger item of waste. Consequently the above figures are not as favorable as those of the preceding year.

| | |
|--|----------------------------|
| The consumption of the year 1899 however was | 2,882,570,430 gallons |
| So that the consumption of 1901, namely | 2,785,156,440 " |
| was not so large as that of 1899 by | <u>97,413,990 gallons.</u> |

WATER METERS.

The total number of meters now in use is one thousand eight hundred ninety-eight (1,898), of which one thousand seventy (1,070) were set this year, in accordance with the vote of the City Council, appropriating the sum of \$10,000 for the purpose of extension of the meter system. The Board earnestly recommend the appropriation of a similar or larger sum for the ensuing year, for the reasons already given in the last annual report. Many water-takers prefer to have water meters attached to their supplies, and have petitioned the Board to that effect, and, so far as they were able, the Board have invariably granted the requests of these water-takers. Unless, however, a suitable appropriation shall be made, the Board will be compelled to disappoint a great many applicants, as they have in several cases been obliged to do heretofore, for want of a sufficient number of meters. The system seems to be growing in favor with the water-takers, especially since the City Council, on the recommendation of the Board, during the past year, reduced the minimum rate for metered water to five dollars, thus making it possible for economical consumers of water to make a considerable saving in the amount of their water bills, which they could not do under the former minimum rate of fifteen dollars.

We must evidence on every hand that the meter system is constantly growing in popularity. In view of the fact that the general use of meters is recommended by the Chief Engineer of the Metropolitan Board, and that the Water Boards of the different cities of the Commonwealth who have adopted a meter system, in whole or in part, unanimously favor that method of distributing water, it is probable that, within a few years, every city in the Commonwealth, including those embraced in the Metropolitan Board, will have adopted the system, either as a matter of necessity, to prevent waste, or as a matter of choice, in order to distribute equitably among the water takers the burden of the expense of maintenance.

Respectfully submitted,

| | |
|---------------------|------------------|
| WILLIAM B. DURANT, | |
| GEORGE H. HOWARD, | <i>Cambridge</i> |
| STILLMAN F. KELLEY, | <i>Water</i> |
| WELLINGTON FILMORE, | <i>Board.</i> |
| EDMUND H. STEVENS, | |

REPORT OF THE WATER REGISTRAR

WATER REGISTRAR'S OFFICE,
CAMBRIDGE, December 5, 1901.

To the Cambridge Water Board:—

GENTLEMEN:—In compliance with the requirements of the City Ordinance I present the thirty-seventh annual report of the operations of this department showing the receipts, expenditures and abatements together with a statement of the number of water takers, etc., for the year ending November 30, 1901.

Amount of bills remaining unpaid November 30, 1900 :—

| | |
|--------------------------------|----------|
| Water rates | \$141 55 |
| Meter rates | 59 00 |
| Supplies and repairs | 561 71 |
| Off and on | 134 00 |
| Seals | 6 25 |
| Maintenance account | 726 30 |
| Construction account | 76 38 |

Amount of bills placed in hands of City Treasurer for collection from November 30, 1900, to November 30, 1901 :—

| | |
|--------------------------------|---------------------|
| Water rates | \$216,596 84 |
| Meter rates | 110,174 36 |
| Supplies and repairs | 5,698 88 |
| Off and on | 649 00 |
| Rents | 168 00 |
| Seals | 153 00 |
| Maintenance account | 2,228 99 |
| Construction account | 15 01 |
| Total bills | <u>\$337,389 27</u> |

There has been collected —

| | |
|--------------------------------|--------------|
| Water rates | \$213,493 04 |
| Meter rates | 109,380 25 |
| Supplies and repairs | 5,253 08 |
| Off and on | 628 00 |
| Rents | 168 00 |
| Seals | 146 00 |
| Maintenance account | 2,561 38 |
| Construction account | 15 01 |

There has been stated

| | |
|--|------------|
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | \$3,791 73 |
|--|------------|

There has been also stated

| | |
|----------------------|--------------|
| Yearly cost | \$74 03 |
| Yearly cost | 140 77 |
| Supplies and repairs | 1 004 81 |
| Oil and gas | 114 00 |
| Other | 6 00 |
| Maintenance account | 391 91 |
| | \$117,249 27 |

EXPENDITURES

| | |
|--|--------------|
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | \$12 176 71 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 79,739 14 |
| | \$111 617 89 |

INDEMNITY

| | |
|--|------------|
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | \$3,714 37 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 3 00 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 76 34 |
| | \$1,791 73 |

REVENUE

| | |
|--|--------------|
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | \$2 611 74 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 172 073 77 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 371 644 01 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 3 341 34 |
| | \$171 971 29 |

NET REVENUE

There has been also stated for non-payment of rates, or for other reasons, and waste have been applied to the same in the amount of

| | |
|--|-----|
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 701 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 172 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 140 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 173 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 601 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 167 |
| Yearly cost of fuel oil and waste, supplies and repairs, and maintenance account | 172 |

Statement of yearly revenue received from water rates since the purchase of the works by the City :—

| | |
|--|------------|
| From April 28, 1865, to December 1, 1865 | £32,367 19 |
| From December 1, 1865, to December 1, 1866 | 40,073 27 |
| From December 1, 1866, to December 1, 1867 | 53,733 62 |
| From December 1, 1867, to December 1, 1868 | 63,747 42 |
| From December 1, 1868, to December 1, 1869 | 76,149 30 |
| From December 1, 1869, to December 1, 1870 | 92,605 95 |
| From December 1, 1870, to December 1, 1871 | 111,782 65 |
| From December 1, 1871, to December 1, 1872 | 127,201 30 |
| From December 1, 1872, to December 1, 1873 | 146,117 32 |
| From December 1, 1873, to December 1, 1874 | 153,634 27 |
| From December 1, 1874, to December 1, 1875 | 138,880 37 |
| From December 1, 1875, to December 1, 1876 | 179,166 76 |
| From December 1, 1876, to December 1, 1877 | 154,843 59 |
| From December 1, 1877, to December 1, 1878 | 157,443 91 |
| From December 1, 1878, to December 1, 1879 | 164,681 90 |
| From December 1, 1879, to December 1, 1880 | 173,325 49 |
| From December 1, 1880, to December 1, 1881 | 170,062 73 |
| From December 1, 1881, to December 1, 1882 | 177,430 80 |
| From December 1, 1882, to December 1, 1883 | 179,361 89 |
| From December 1, 1883, to December 1, 1884 | 161,526 27 |
| From December 1, 1884, to December 1, 1885 | 185,544 36 |
| From December 1, 1885, to December 1, 1886 | 199,404 48 |
| From December 1, 1886, to December 1, 1887 | 204,748 64 |
| From December 1, 1887, to December 1, 1888 | 211,156 27 |
| From December 1, 1888, to December 1, 1889 | 221,124 70 |
| From December 1, 1889, to December 1, 1890 | 231,116 32 |
| From December 1, 1890, to December 1, 1891 | 227,054 53 |
| From December 1, 1891, to December 1, 1892 | 237,527 08 |
| From December 1, 1892, to December 1, 1893 | 242,219 78 |
| From December 1, 1893, to December 1, 1894 | 250,032 71 |
| From December 1, 1894, to December 1, 1895 | 268,813 62 |
| From December 1, 1895, to December 1, 1896 | 281,030 00 |
| From December 1, 1896, to December 1, 1897 | 291,457 62 |
| From December 1, 1897, to December 1, 1898 | 297,129 78 |
| From December 1, 1898, to December 1, 1899 | 302,569 00 |
| From December 1, 1899, to December 1, 1900 | 319,479 37 |
| From December 1, 1900, to December 1, 1901 | 320,468 01 |

COMPARATIVE STATEMENT

| | 1940 | 1941 |
|--------------------------------------|--------------------|--------------------|
| STATE OF CALIFORNIA | | |
| Department of Water Resources | | |
| Operating Expenses | \$9,200 00 | \$9,200 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 8,000 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$9,200 00 | \$9,200 00 |
| Department of Public Works | | |
| Operating Expenses | \$10,000 00 | \$10,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 8,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$10,000 00 | \$10,000 00 |
| Department of Transportation | | |
| Operating Expenses | \$11,000 00 | \$11,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 9,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$11,000 00 | \$11,000 00 |
| Department of Agriculture | | |
| Operating Expenses | \$12,000 00 | \$12,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 10,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$12,000 00 | \$12,000 00 |
| Department of Education | | |
| Operating Expenses | \$13,000 00 | \$13,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 11,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$13,000 00 | \$13,000 00 |
| Department of Health | | |
| Operating Expenses | \$14,000 00 | \$14,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 12,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$14,000 00 | \$14,000 00 |
| Department of Social Services | | |
| Operating Expenses | \$15,000 00 | \$15,000 00 |
| Salaries | | |
| State Employees | \$1,200 00 | |
| Contract Employees | 13,800 00 | |
| Supplies | 100 00 | |
| Travel | 600 00 | |
| Telephone | | |
| State Employees | | |
| Contract Employees | | |
| Postage | | |
| State Employees | | |
| Contract Employees | | |
| Printing | | |
| State Employees | | |
| Contract Employees | | |
| Repairs | | |
| State Employees | | |
| Contract Employees | | |
| Light and Power | | |
| State Employees | | |
| Contract Employees | | |
| Interest | | |
| State Employees | | |
| Contract Employees | | |
| Depreciation | | |
| State Employees | | |
| Contract Employees | | |
| Other | | |
| State Employees | | |
| Contract Employees | | |
| Total | \$15,000 00 | \$15,000 00 |

COMPARATIVE STATEMENT.—Continued.

| | 1900 | | 1901 | |
|---|----------|----------|------|------------|
| Maintenance account, excess of receipts..... | \$14,667 | 59 | | |
| Supply account, excess of expenditures..... | 335 | 48 | | |
| Excess of total receipts over total expenditures..... | | \$14,332 | 11 | |
| Maintenance account, excess of receipts..... | | | | \$2,649 05 |

The excess of receipts shown above, amounting to \$2,649.05 has been carried to the sinking fund as required by law.

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 19,630 families, 751 stables, 2,481 horses, 131 cows, 263 shops, and 594 offices and stores, by the following fixtures, viz :—

| | |
|---------------------|---------------------|
| 23,136 faucets, | 52 urinals, |
| 8,760 wash basins, | 10 yard hydrants, |
| 12,056 wash tubs, | 5 fountains, |
| 7,840 bath tubs, | 28 tumbler washers, |
| 258 slop closets, | 2,068 hand hose, |
| 20,047 pan closets, | 17 motors. |
| 4 hopper closets, | |

Also,

- 978 fire hydrants (beside 19 on private premises).
- 8 fire reservoirs.
- 28 drinking fountains in public squares.
- 59 street watering standpipes.
- 4 public sanitaries.

The above schedule of fixtures does not include those in schoolhouses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made with very satisfactory results.

Respectfully submitted,

WALTER H. HARDING,
Registrar.

ANNUAL STATEMENT OF THE WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DECEMBER 1, 1901

| | |
|---|----------|
| Water sold to regular customers November 1st 1901 | \$240 25 |
| Water sold to regular customers November 20 1901 | 541 71 |
| Water sold to regular customers November 30 1901 | 134 00 |
| Water sold to regular customers November 30 1900 | 4 25 |
| Water sold to regular customers November 30 1900 | 776 20 |
| Water sold to regular customers November 30 1900 | 74 30 |

\$1,766 71

Water sold to the Board of the City
from November 1st to November 30 1901

| | |
|-----------------------------------|-------------|
| Water sold from annual meters | \$210 77 10 |
| Water sold from fractional meters | 3 07 00 |
| Water sold from water meters | 110 74 34 |
| Water sold from water meters | 649 00 |
| Water sold from water meters | 153 00 |
| Water sold from water meters | 140 00 |
| Water sold from water meters | 3 270 00 |
| Water sold from water meters | 2 270 00 |
| Water sold from water meters | 15 00 |
| Water sold from water meters | 1 15 00 |

\$1,766 71

\$1,766 71

Water sold to regular customers

| | |
|---------------------------------|-------------|
| Water sold to regular customers | \$210 77 10 |
| Water sold to regular customers | 3 07 10 |
| Water sold to regular customers | 110 74 34 |
| Water sold to regular customers | 649 00 |
| Water sold to regular customers | 153 00 |
| Water sold to regular customers | 140 00 |
| Water sold to regular customers | 3 270 00 |
| Water sold to regular customers | 2 270 00 |
| Water sold to regular customers | 15 00 |
| Water sold to regular customers | 1 15 00 |

\$1,766 71

Water sold to regular customers

| | |
|---------------------------------|------------|
| Water sold to regular customers | \$1,766 71 |
|---------------------------------|------------|

There remains uncollected:—

| | | |
|--------------------------------------|------------|--------------------|
| Water rates | \$428 34 | |
| Supplies and repairs | 1,004 51 | |
| Off and on | 118 00 | |
| Seals | 6 00 | |
| Maintenance account | 393 91 | |
| | <hr/> | 5,744 51 |
| Total bills for collection | | <hr/> \$338,919 27 |
| Less abated | \$3,793 75 | |
| Less refunded | 2,405 28 | |
| Less unpaid | 1,950 76 | |
| | <hr/> | \$8,149 79 |
| Net receipts | | <hr/> \$330,769 48 |

Attest:

WALTER H. HARDING,

Registrar.

CAMBRIDGE, December 10, 1901.

I have examined the accounts of the Water Registrar and find that they correspond in the amounts collected, abated, refunded and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor.

STILLMAN F. KELLEY,

Committee on Accounts.

CITY OF CAMBRIDGE,
OFFICE OF CITY TREASURER,

December 2, 1901

To the Honorable Water Board

Dear Sirs: I enclose herewith a record of the transactions between the Water Board and the City Treasurer's Office during the year ending November 30, 1901.

| | |
|--|--------------|
| Amount received for account of Water Works, "Water Rates,"
"Maintenance" and "Supply" Accounts | \$333,367 12 |
| Amount also received and paid on "Water Rates" | 3 73 78 |
| Amount also have been received and paid to amount of | 7 603 20 |
| Amount paid to the Water Board November 30, 1901, for account of
"Water Rates," "Maintenance" and "Supply" Accounts | 1 920 76 |
| Amount paid to the account of Water Works, "Construction" | 1,631 20 |

Very respectfully,

WM. W. DALLINGER,

City Treasurer.

I have read and the above statement and find it correct

HENRY T. PHAM

City Auditor

REPORT OF THE SUPERINTENDENT OF WATER WORKS

CAMBRIDGE, December 2, 1901.

To the Honorable Water Board of the City of Cambridge :

GENTLEMEN:—Complying with the City Ordinance, I herewith submit the twenty-seventh annual report of the Superintendent, for the year ending November 30, 1901.

CONSUMPTION.

| | Gallons. |
|---|---------------|
| Total quantity of water consumed during the past year | 2,745,156,440 |
| Daily average water consumed during the past year | 7,520,976 |
| Quantity of water sold by meter | 785,986,760 |
| Quantity of water used for sprinkling streets | 79,738,425 |
| Quantity of water used for flushing sewers | 1,250,000 |
| Quantity of water used for cleaning sanitaries | 7,500,000 |
| Quantity of water used for drinking fountains | 35,000,000 |
| Quantity of water used for testing meters | 113,535 |
| Total | 909,538,780 |
| Leaving for domestic purposes | 1,835,617,660 |

Number of gallons daily for each inhabitant on the total amount consumed, 80.87.

Number of gallons daily for each inhabitant on the total amount used for domestic purposes, including water for private stables, hose, public buildings and fire purposes, 54.07.

COMPARATIVE STATEMENT OF TOTAL PUMPING DURING THE PAST TEN YEARS.

| Date. | Total Yearly Pumping. | Increase or Decrease. | Average Daily Pumping. | Increase or Decrease | Gallons to each inhabitant daily. |
|-------|-----------------------|-----------------------|------------------------|----------------------|-----------------------------------|
| 1892 | 183,305,687 | Increase | 5,358,915 | 487,527 Increase | 66.09 |
| 1893 | 273,501,164 | " | 6,122,915 | 764,000 " | 74.50 |
| 1894 | 106,985,207 | decrease | 5,829,804 | 288,111 decrease | 69.19 |
| 1895 | 62,803,265 | Increase | 6,002,142 | 172,338 Increase | 71.63 |
| 1896 | 222,724,665 | " | 6,684,280 | 582,138 " | 75.80 |
| 1897 | 27,838,639 | " | 6,688,603 | 94,323 " | 75.45 |
| 1898 | 350,980,914 | " | 7,650,195 | 961,592 " | 83.09 |
| 1899 | 90,241,320 | " | 7,807,463 | 247,258 " | 87.16 |
| 1900 | 231,298,180 | decrease | 7,283,773 | 685,680 decrease | 78.09 |
| 1901 | 133,679,200 | Increase | 7,630,666 | 366,793 Increase | 80.97 |

STATEMENT OF THE REVENUE DURING THE LAST TEN YEARS

| Year | Revenue from Water Works | Revenue from Sewerage | Revenue from Gas | Revenue from Electricity | Revenue from Other Sources |
|------|--------------------------|-----------------------|------------------|--------------------------|----------------------------|
| 1891 | 100,000 | 50,000 | 20,000 | 10,000 | 20,000 |
| 1892 | 110,000 | 55,000 | 22,000 | 12,000 | 21,000 |
| 1893 | 120,000 | 60,000 | 24,000 | 14,000 | 22,000 |
| 1894 | 130,000 | 65,000 | 26,000 | 16,000 | 23,000 |
| 1895 | 140,000 | 70,000 | 28,000 | 18,000 | 24,000 |
| 1896 | 150,000 | 75,000 | 30,000 | 20,000 | 25,000 |
| 1897 | 160,000 | 80,000 | 32,000 | 22,000 | 26,000 |
| 1898 | 170,000 | 85,000 | 34,000 | 24,000 | 27,000 |
| 1899 | 180,000 | 90,000 | 36,000 | 26,000 | 28,000 |
| 1900 | 190,000 | 95,000 | 38,000 | 28,000 | 29,000 |
| 1901 | 200,000 | 100,000 | 40,000 | 30,000 | 30,000 |
| 1902 | 210,000 | 105,000 | 42,000 | 32,000 | 31,000 |
| 1903 | 220,000 | 110,000 | 44,000 | 34,000 | 32,000 |
| 1904 | 230,000 | 115,000 | 46,000 | 36,000 | 33,000 |
| 1905 | 240,000 | 120,000 | 48,000 | 38,000 | 34,000 |
| 1906 | 250,000 | 125,000 | 50,000 | 40,000 | 35,000 |
| 1907 | 260,000 | 130,000 | 52,000 | 42,000 | 36,000 |
| 1908 | 270,000 | 135,000 | 54,000 | 44,000 | 37,000 |
| 1909 | 280,000 | 140,000 | 56,000 | 46,000 | 38,000 |
| 1910 | 290,000 | 145,000 | 58,000 | 48,000 | 39,000 |
| 1911 | 300,000 | 150,000 | 60,000 | 50,000 | 40,000 |
| 1912 | 310,000 | 155,000 | 62,000 | 52,000 | 41,000 |
| 1913 | 320,000 | 160,000 | 64,000 | 54,000 | 42,000 |
| 1914 | 330,000 | 165,000 | 66,000 | 56,000 | 43,000 |
| 1915 | 340,000 | 170,000 | 68,000 | 58,000 | 44,000 |
| 1916 | 350,000 | 175,000 | 70,000 | 60,000 | 45,000 |
| 1917 | 360,000 | 180,000 | 72,000 | 62,000 | 46,000 |
| 1918 | 370,000 | 185,000 | 74,000 | 64,000 | 47,000 |
| 1919 | 380,000 | 190,000 | 76,000 | 66,000 | 48,000 |
| 1920 | 390,000 | 195,000 | 78,000 | 68,000 | 49,000 |
| 1921 | 400,000 | 200,000 | 80,000 | 70,000 | 50,000 |
| 1922 | 410,000 | 205,000 | 82,000 | 72,000 | 51,000 |
| 1923 | 420,000 | 210,000 | 84,000 | 74,000 | 52,000 |
| 1924 | 430,000 | 215,000 | 86,000 | 76,000 | 53,000 |
| 1925 | 440,000 | 220,000 | 88,000 | 78,000 | 54,000 |
| 1926 | 450,000 | 225,000 | 90,000 | 80,000 | 55,000 |
| 1927 | 460,000 | 230,000 | 92,000 | 82,000 | 56,000 |
| 1928 | 470,000 | 235,000 | 94,000 | 84,000 | 57,000 |
| 1929 | 480,000 | 240,000 | 96,000 | 86,000 | 58,000 |
| 1930 | 490,000 | 245,000 | 98,000 | 88,000 | 59,000 |
| 1931 | 500,000 | 250,000 | 100,000 | 90,000 | 60,000 |
| 1932 | 510,000 | 255,000 | 102,000 | 92,000 | 61,000 |
| 1933 | 520,000 | 260,000 | 104,000 | 94,000 | 62,000 |
| 1934 | 530,000 | 265,000 | 106,000 | 96,000 | 63,000 |
| 1935 | 540,000 | 270,000 | 108,000 | 98,000 | 64,000 |
| 1936 | 550,000 | 275,000 | 110,000 | 100,000 | 65,000 |
| 1937 | 560,000 | 280,000 | 112,000 | 102,000 | 66,000 |
| 1938 | 570,000 | 285,000 | 114,000 | 104,000 | 67,000 |
| 1939 | 580,000 | 290,000 | 116,000 | 106,000 | 68,000 |
| 1940 | 590,000 | 295,000 | 118,000 | 108,000 | 69,000 |
| 1941 | 600,000 | 300,000 | 120,000 | 110,000 | 70,000 |
| 1942 | 610,000 | 305,000 | 122,000 | 112,000 | 71,000 |
| 1943 | 620,000 | 310,000 | 124,000 | 114,000 | 72,000 |
| 1944 | 630,000 | 315,000 | 126,000 | 116,000 | 73,000 |
| 1945 | 640,000 | 320,000 | 128,000 | 118,000 | 74,000 |
| 1946 | 650,000 | 325,000 | 130,000 | 120,000 | 75,000 |
| 1947 | 660,000 | 330,000 | 132,000 | 122,000 | 76,000 |
| 1948 | 670,000 | 335,000 | 134,000 | 124,000 | 77,000 |
| 1949 | 680,000 | 340,000 | 136,000 | 126,000 | 78,000 |
| 1950 | 690,000 | 345,000 | 138,000 | 128,000 | 79,000 |
| 1951 | 700,000 | 350,000 | 140,000 | 130,000 | 80,000 |
| 1952 | 710,000 | 355,000 | 142,000 | 132,000 | 81,000 |
| 1953 | 720,000 | 360,000 | 144,000 | 134,000 | 82,000 |
| 1954 | 730,000 | 365,000 | 146,000 | 136,000 | 83,000 |
| 1955 | 740,000 | 370,000 | 148,000 | 138,000 | 84,000 |
| 1956 | 750,000 | 375,000 | 150,000 | 140,000 | 85,000 |
| 1957 | 760,000 | 380,000 | 152,000 | 142,000 | 86,000 |
| 1958 | 770,000 | 385,000 | 154,000 | 144,000 | 87,000 |
| 1959 | 780,000 | 390,000 | 156,000 | 146,000 | 88,000 |
| 1960 | 790,000 | 395,000 | 158,000 | 148,000 | 89,000 |
| 1961 | 800,000 | 400,000 | 160,000 | 150,000 | 90,000 |
| 1962 | 810,000 | 405,000 | 162,000 | 152,000 | 91,000 |
| 1963 | 820,000 | 410,000 | 164,000 | 154,000 | 92,000 |
| 1964 | 830,000 | 415,000 | 166,000 | 156,000 | 93,000 |
| 1965 | 840,000 | 420,000 | 168,000 | 158,000 | 94,000 |
| 1966 | 850,000 | 425,000 | 170,000 | 160,000 | 95,000 |
| 1967 | 860,000 | 430,000 | 172,000 | 162,000 | 96,000 |
| 1968 | 870,000 | 435,000 | 174,000 | 164,000 | 97,000 |
| 1969 | 880,000 | 440,000 | 176,000 | 166,000 | 98,000 |
| 1970 | 890,000 | 445,000 | 178,000 | 168,000 | 99,000 |
| 1971 | 900,000 | 450,000 | 180,000 | 170,000 | 100,000 |
| 1972 | 910,000 | 455,000 | 182,000 | 172,000 | 101,000 |
| 1973 | 920,000 | 460,000 | 184,000 | 174,000 | 102,000 |
| 1974 | 930,000 | 465,000 | 186,000 | 176,000 | 103,000 |
| 1975 | 940,000 | 470,000 | 188,000 | 178,000 | 104,000 |
| 1976 | 950,000 | 475,000 | 190,000 | 180,000 | 105,000 |
| 1977 | 960,000 | 480,000 | 192,000 | 182,000 | 106,000 |
| 1978 | 970,000 | 485,000 | 194,000 | 184,000 | 107,000 |
| 1979 | 980,000 | 490,000 | 196,000 | 186,000 | 108,000 |
| 1980 | 990,000 | 495,000 | 198,000 | 188,000 | 109,000 |
| 1981 | 1,000,000 | 500,000 | 200,000 | 190,000 | 110,000 |
| 1982 | 1,010,000 | 505,000 | 202,000 | 192,000 | 111,000 |
| 1983 | 1,020,000 | 510,000 | 204,000 | 194,000 | 112,000 |
| 1984 | 1,030,000 | 515,000 | 206,000 | 196,000 | 113,000 |
| 1985 | 1,040,000 | 520,000 | 208,000 | 198,000 | 114,000 |
| 1986 | 1,050,000 | 525,000 | 210,000 | 200,000 | 115,000 |
| 1987 | 1,060,000 | 530,000 | 212,000 | 202,000 | 116,000 |
| 1988 | 1,070,000 | 535,000 | 214,000 | 204,000 | 117,000 |
| 1989 | 1,080,000 | 540,000 | 216,000 | 206,000 | 118,000 |
| 1990 | 1,090,000 | 545,000 | 218,000 | 208,000 | 119,000 |
| 1991 | 1,100,000 | 550,000 | 220,000 | 210,000 | 120,000 |
| 1992 | 1,110,000 | 555,000 | 222,000 | 212,000 | 121,000 |
| 1993 | 1,120,000 | 560,000 | 224,000 | 214,000 | 122,000 |
| 1994 | 1,130,000 | 565,000 | 226,000 | 216,000 | 123,000 |
| 1995 | 1,140,000 | 570,000 | 228,000 | 218,000 | 124,000 |
| 1996 | 1,150,000 | 575,000 | 230,000 | 220,000 | 125,000 |
| 1997 | 1,160,000 | 580,000 | 232,000 | 222,000 | 126,000 |
| 1998 | 1,170,000 | 585,000 | 234,000 | 224,000 | 127,000 |
| 1999 | 1,180,000 | 590,000 | 236,000 | 226,000 | 128,000 |
| 2000 | 1,190,000 | 595,000 | 238,000 | 228,000 | 129,000 |
| 2001 | 1,200,000 | 600,000 | 240,000 | 230,000 | 130,000 |
| 2002 | 1,210,000 | 605,000 | 242,000 | 232,000 | 131,000 |
| 2003 | 1,220,000 | 610,000 | 244,000 | 234,000 | 132,000 |
| 2004 | 1,230,000 | 615,000 | 246,000 | 236,000 | 133,000 |
| 2005 | 1,240,000 | 620,000 | 248,000 | 238,000 | 134,000 |
| 2006 | 1,250,000 | 625,000 | 250,000 | 240,000 | 135,000 |
| 2007 | 1,260,000 | 630,000 | 252,000 | 242,000 | 136,000 |
| 2008 | 1,270,000 | 635,000 | 254,000 | 244,000 | 137,000 |
| 2009 | 1,280,000 | 640,000 | 256,000 | 246,000 | 138,000 |
| 2010 | 1,290,000 | 645,000 | 258,000 | 248,000 | 139,000 |
| 2011 | 1,300,000 | 650,000 | 260,000 | 250,000 | 140,000 |
| 2012 | 1,310,000 | 655,000 | 262,000 | 252,000 | 141,000 |
| 2013 | 1,320,000 | 660,000 | 264,000 | 254,000 | 142,000 |
| 2014 | 1,330,000 | 665,000 | 266,000 | 256,000 | 143,000 |
| 2015 | 1,340,000 | 670,000 | 268,000 | 258,000 | 144,000 |
| 2016 | 1,350,000 | 675,000 | 270,000 | 260,000 | 145,000 |
| 2017 | 1,360,000 | 680,000 | 272,000 | 262,000 | 146,000 |
| 2018 | 1,370,000 | 685,000 | 274,000 | 264,000 | 147,000 |
| 2019 | 1,380,000 | 690,000 | 276,000 | 266,000 | 148,000 |
| 2020 | 1,390,000 | 695,000 | 278,000 | 268,000 | 149,000 |
| 2021 | 1,400,000 | 700,000 | 280,000 | 270,000 | 150,000 |
| 2022 | 1,410,000 | 705,000 | 282,000 | 272,000 | 151,000 |
| 2023 | 1,420,000 | 710,000 | 284,000 | 274,000 | 152,000 |
| 2024 | 1,430,000 | 715,000 | 286,000 | 276,000 | 153,000 |
| 2025 | 1,440,000 | 720,000 | 288,000 | 278,000 | 154,000 |
| 2026 | 1,450,000 | 725,000 | 290,000 | 280,000 | 155,000 |
| 2027 | 1,460,000 | 730,000 | 292,000 | 282,000 | 156,000 |
| 2028 | 1,470,000 | 735,000 | 294,000 | 284,000 | 157,000 |
| 2029 | 1,480,000 | 740,000 | 296,000 | 286,000 | 158,000 |
| 2030 | 1,490,000 | 745,000 | 298,000 | 288,000 | 159,000 |
| 2031 | 1,500,000 | 750,000 | 300,000 | 290,000 | 160,000 |
| 2032 | 1,510,000 | 755,000 | 302,000 | 292,000 | 161,000 |
| 2033 | 1,520,000 | 760,000 | 304,000 | 294,000 | 162,000 |
| 2034 | 1,530,000 | 765,000 | 306,000 | 296,000 | 163,000 |
| 2035 | 1,540,000 | 770,000 | 308,000 | 298,000 | 164,000 |
| 2036 | 1,550,000 | 775,000 | 310,000 | 300,000 | 165,000 |
| 2037 | 1,560,000 | 780,000 | 312,000 | 302,000 | 166,000 |
| 2038 | 1,570,000 | 785,000 | 314,000 | 304,000 | 167,000 |
| 2039 | 1,580,000 | 790,000 | 316,000 | 306,000 | 168,000 |
| 2040 | 1,590,000 | 795,000 | 318,000 | 308,000 | 169,000 |
| 2041 | 1,600,000 | 800,000 | 320,000 | 310,000 | 170,000 |
| 2042 | 1,610,000 | 805,000 | 322,000 | 312,000 | 171,000 |
| 2043 | 1,620,000 | 810,000 | 324,000 | 314,000 | 172,000 |
| 2044 | 1,630,000 | 815,000 | 326,000 | 316,000 | 173,000 |
| 2045 | 1,640,000 | 820,000 | 328,000 | 318,000 | 174,000 |
| 2046 | 1,650,000 | 825,000 | 330,000 | 320,000 | 175,000 |
| 2047 | 1,660,000 | 830,000 | 332,000 | 322,000 | 176,000 |
| 2048 | 1,670,000 | 835,000 | 334,000 | 324,000 | 177,000 |
| 2049 | 1,680,000 | 840,000 | 336,000 | 326,000 | 178,000 |
| 2050 | 1,690,000 | 845,000 | 338,000 | 328,000 | 179,000 |
| 2051 | 1,700,000 | 850,000 | 340,000 | 330,000 | 180,000 |
| 2052 | 1,710,000 | 855,000 | 342,000 | 332,000 | 181,000 |
| 2053 | 1,720,000 | 860,000 | 344,000 | 334,000 | 182,000 |
| 2054 | 1,730,000 | 865,000 | 346,000 | 336,000 | 183,000 |
| 2055 | 1,740,000 | 870,000 | 348,000 | 338,000 | 184,000 |
| 2056 | 1,750,000 | 875,000 | 350,000 | 340,000 | 185,000 |
| 2057 | 1,760,000 | 880,000 | 352,000 | 342,000 | 186,000 |
| 2058 | | | | | |

FRESH POND AND SURROUNDINGS.

The care of the grounds and roads about the pond and the propagation and care of the plants and shrubs in the nursery has continued as in past years.

On September 3rd, work was begun on continuing the grading on the west side of the Pond, from the point where it was left three years ago towards Concord Avenue. Nearly seven acres have been graded and planted, adding very much to the appearance of that part of the grounds. The work was continued until November 30th and comparatively little more remains to be done to complete that portion of the work.

The plants on the previously graded sections have made good growth and have added very much to the attractiveness of this section the past season.

The sales from the nursery the past year have amounted to eight hundred eighty dollars and forty-two cents (\$880.42). All standing grass not needed by the department has been sold.

The average height of the Pond for the past year has been 15.69 feet.

A larger amount of the weeding of the shallow portions of the Pond than usual, has been necessary this year.

Two catch basins have been constructed on Huron Avenue and two near the end of Holworthy Street to prevent the wash from the streets running into the Pond.

FROM FILED DESCRIPTION

| | | 1878 | | 1879 | | 1880 | |
|--|--|------|--|------|--|------|--|
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
| | | 1878 | | 1879 | | 1880 | |
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APPENDIX: STATIONS AND COORDINATES

I am glad to hear that you have done
 well in your studies. I hope you will
 continue to work hard and achieve
 great things in the future. I am
 proud of you and your accomplishments.

100.111 AND 100.112 RE-APPROVED

[illegible]

PAYSON PARK RESERVOIR.

The north basin of this reservoir was cleaned out early this season and a check valve placed on the mud pipe leading to the main drain. A short length of four-inch drain was laid along the foot of the slopes on the south-east corner of the south basin to carry off water that appeared to be coming through the ground.

The roadway from Common Street to Elm Street has been graded and put in good condition by the Payson Park Land Company. The sidewalks about the reservoir grounds should be graded and properly surfaced.

The buildings and the reservoir grounds are in first-class condition.

The leakage from the basin continues about the same as at the last report.

PIPE YARD.

The buildings at the yard are in need of painting and a new fence should be built along the Auburn Street side.

HIGH SERVICE.

On September 9th the pressure on the City mains was increased by the adjustment of the regulator valves so that the highest buildings on Dana Hill could be supplied from the low service, and on the 23rd of the same month the gates and check valves were opened and the high service since that date has supplied only that portion of the high land situated on the following streets:—

Agassiz Street.
 Appleton Street, from Highland Street
 to beyond Hutchinson Street.
 Arlington Street.
 Avon Hill Street.
 Bates Street.
 Bellevue Avenue.
 Bellevue Avenue, west.
 Buena Vista Park.
 Garden Street, from Huron Avenue to
 Linnaean Street.
 Highland Street, from Reservoir Street
 to Appleton Street.
 Hillside Avenue.
 Holly Avenue.
 Humboldt Street.

Huron Avenue, from Appleton Street
 to Raymond Street.
 Lancaster Street.
 Linnaean Street.
 Mount Pleasant Street.
 Mount Vernon Street.
 Raymond Street, from Linnaean Street
 to Walden Street.
 Reservoir Street, from Highland Street.
 Upland Road, from Richdale Avenue
 to Huron Avenue.
 Vassal Lane, from Huron Avenue.
 Vincent Street.
 Walnut Avenue.
 Washington Avenue.

LIST OF CHECK VALVES IN USE

Bay Street at Hutchinson Street

Bay Street and Linnahan Street

Bay Street and Linnahan Street

Bay Street, one hundred feet west from Massachusetts

Street

Bay Street and Linnahan Street

Bay Street at Warden Street

LEAKAGE

During the year 1902 2,302 leaks have been repaired during

the year. They were discovered as follows:

1,000 on the 142 in supply in street

1,000 on the 142 in supply in street

1,000 on the 142 in supply

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During the year 1902 2,302 leaks have been repaired during the year. They were discovered as follows:

1,000

1,000 on the 142 in supply

1,000 on the 142 in supply

1,000 on the 142 in supply

Twenty-eight (28) on pipes.

Twenty-one (21) on tanks.

Fifteen (15) on stop and waste valves.

Eleven (11) on bath tubs.

Six (6) on wash trays.

Three (3) on sill cocks.

Ten (10) leaks on supplies in the street have been caused by electrolysis. The cost of repairs, one hundred sixty-nine dollars and seventy-four cents (\$169.74) has been charged to the Boston Elevated Railway Company.

TABLE SHOWING A GAIN OR LOSS IN TOTAL CONSUMPTION FOR THE
YEAR 1901 OVER THE YEAR 1900.

| | Total Consump-
tion 1901. | Total Consump-
tion 1900. | Increase or
Decrease, + or -. |
|----------------|------------------------------|------------------------------|----------------------------------|
| December..... | 220,410,520 | 204,553,360 | +15,857,160 |
| January..... | 239,847,080 | 243,173,920 | -3,326,840 |
| February..... | 235,592,720 | 199,942,120 | +35,650,600 |
| March..... | 222,808,960 | 229,562,080 | -6,753,120 |
| April..... | 208,326,800 | 201,539,860 | +6,786,940 |
| May..... | 207,740,720 | 195,051,120 | +12,689,600 |
| June..... | 236,636,840 | 225,405,400 | +11,231,440 |
| July..... | 255,524,280 | 274,256,400 | -18,732,120 |
| August..... | 246,125,000 | 226,855,640 | +19,269,360 |
| September..... | 231,464,200 | 224,104,760 | +7,359,440 |
| October..... | 250,991,840 | 224,248,580 | +26,743,260 |
| November..... | 229,687,480 | 202,584,500 | +27,102,980 |
| Total..... | 2,785,156,440 | 2,651,277,240 | 133,879,200 |

MAIN PIPE.

Nine thousand eight hundred seventy-six (9,876) feet of main pipe have been laid during the year; of the above amount four thousand one hundred twenty-six (4,126) feet were for extension and five thousand seven hundred fifty (5,750) feet were for renewal. The sizes were from two-inch to twelve-inch.

In Ellery Street from Broadway to Cambridge Street a new eight-inch main has been laid to replace the old four-inch laid in 1867, and six-inch laid in 1869.

In Eighth Street from Spring Street the laying of the new six-inch main pipe does away with the old three-inch laid in 1867.

MAIN PIPE LAID, NUMBERS OF GATES AND FIRE HYDRANTS.—Continued.

| | IRON PIPE. | | GATES. | | HYDRANTS. | |
|---|------------|-------|--------|------|-----------|----------|
| | Length | Size. | No. | Size | No. | Kind. |
| Eighth St., at Spring..... | | | 1 | 6 | | |
| Ellsworth Ave., at Broadway..... | | | | | 1 | Chapman. |
| Front St., from Winsor to Mass. Ave..... | 181 | 4 | | | | |
| " at Winsor..... | | | 1 | 8 | | |
| Grant St., corner DeWolf..... | | | | | 1 | Chapman. |
| Garden St., from Bond to Concord Ave..... | 1,284½ | 8 | | | | |
| " at Bond..... | | | 1 | 8 | | |
| " at Chauncy..... | 10 | 6 | | | | |
| " at Shepard..... | 257 | 4 | | | 1 | Chapman. |
| Granite St., from Magazine..... | | | | | | |
| " at Magazine..... | | | 1 | 4 | | |
| " from Pearl to Brookline..... | 575½ | 6 | | | | |
| " at Rockingham..... | 5 | 6 | | | 1 | Chapman. |
| Gorham..... | 36 | 6 | | | 1 | Chapman. |
| Highland..... | 5 | 10 | 1 | 10 | | |
| Highland..... | 8 | 12 | | | 1 | Flush. |
| | | | 1 | 4 | | |
| | 107 | 2 | | | | |
| | 226 | 4 | 1 | 6 | | |
| Marcella St., to Portland..... | 323 | 6 | | | | |
| "..... | | | 1 | 6 | | |
| Mass Ave..... | 10 | 6 | | | 1 | Chapman. |
| " to Trowbridge..... | 1,112½ | 10 | | | 1 | Chapman. |
| "..... | 36 | 6 | | | | |
| "..... | 10 | 6 | 1 | 10 | | |
| "..... | | | | | 1 | Chapman. |
| Murdock St..... | | | 1 | 4 | | |
| Norris St..... | | | | | 1 | Chapman. |
| Norumbega St., from Belmont..... | 205 | 6 | | | | |
| " at Belmont..... | | | 1 | 6 | | |
| " at Belmont..... | 6 | 6 | | | 1 | Chapman. |
| Oxford St., at Kirkland..... | | | 1 | 6 | | |
| Osborn St., corner Main..... | | | 1 | 6 | | |
| Pearl St..... | 13 | 6 | | | 1 | Chapman. |
| Plympton St., from Mt. Auburn to Bow..... | 41 | 6 | | | | |
| " at Mt. Auburn..... | | | 1 | 6 | | |
| "..... | 6 | 6 | | | 1 | Chapman. |
| Putnam..... | 24 | 10 | | | | |
| Quincy..... | 468 | 6 | | | | |
| "..... | 6 | 6 | | | 1 | Chapman. |
| Remington..... | 10 | 6 | | | | |
| " 155 ft. from Harvard..... | 6 | 6 | | | 1 | Chapman. |
| " from Mass. Ave..... | | | | | 1 | Flush. |
| | 12 | 4 | 1 | 4 | | |
| Sparks St.,..... | 7 | 6 | | | 1 | Chapman. |
| "..... | 87 | 6 | | | | |
| "..... | | | 1 | 6 | | |
| Walker St., Shepard..... | 640 | 6 | | | | |
| " at Garden..... | 844½ | 6 | | | | |
| " at No. 35..... | 16 | 6 | 1 | 6 | | |
| " Ave..... | 6 | 6 | | | 1 | Chapman. |
| "..... | 364 | 6 | | | | |
| "..... | 8½ | 6 | | | 1 | Chapman. |
| "..... | 283 | 6 | | | 1 | Coffin. |
| "..... | 489 | 6 | | | | |
| " at Mass. Ave..... | | | 1 | 6 | | |

Belmont Street, Bolton Street, Erie Street, Eustis Street, Hampsh Street, Harris Street, Montgomery Street and Sherman Street.

The temporary supplies laid for the use of the Sewer Department its construction of sewers have been removed.

All the supplies in Mt. Auburn Street are now fed from the two four inch, the old four-inch having been abandoned.

In Prison Point Street all the old pipes which have formerly supplied the Boston & Maine Railroad Company have been removed.

In Clark Street from School Street to Washington Street the supplies have been moved to conform to the changes in the street lines.

Following is the list of establishments having fire protection from the City of Cambridge:—

| | | |
|--|--------------------------------------|----------------|
| American Rubber Co., | Binney street, | Two 6-in. |
| American Net & Twine Co., | Third street, | 6-in. |
| Barber Asphalt Paving Co., | First street, | 6-in. |
| Bay State Metal Works, | Harvard street, | 6-in. |
| Blacker & Shepard, | Osborn street, | 2-in. |
| Blake, Geo. F., Manufacturing Co., | Third street, | 4-in. |
| Boston Book Binding Co., | Mt. Auburn street, | 6-in. & 4-in. |
| Boston Elevated Railway Co., | Baldwin street, | 2-in. & 4-in. |
| " " " " | Cambridge street, | Two 2-in. |
| " " " " | Pelham street, | 3-4-in. |
| " " " " | Massachusetts ave., | 4-in. |
| " " " " | Mt. Auburn street, | 2-in. & 4-in. |
| " " " " | Murray street, | 4-in. |
| " " " " | River street, | 4-in. |
| Boston & Maine Railroad Co., | Bridge street, | 4-in. |
| " " " " | Bridge street, | 6-in. |
| " " " " | Prison Point street, | 4-in. |
| Boston Woven Hose & Rubber Co., | Portland street, | 10-in. & 8-in. |
| Cambridge Gas Co., | Third street, | 6-in. |
| Cambridge Mutual Fire Insurance Co., | Massachusetts ave., | 2-in. |
| Chelmsford Foundry Co., | Portland street, | 2-in. |
| Davis, Curtis & Co., | Broadway, | 6-in. |
| Davis, James C. & Co., | Broadway, | 4-in. & 6-in. |
| Dover Stamping Co., | Pleasant street, | 6-in. |
| Dow, John C. & Co., | Portland street, | 2-in. |
| Forgarty & Daly, | Massachusetts ave., | 4-in. |
| Ginn & Co., | First street, | Two 6-in. |
| " " | Athenæum street, | One 8-in. |
| Goepper Bros., | Ninth street, | 1 1-2-in. |
| Harvard College, | H'v'rd Union, Harvard st., | 4-in. |
| " " | Memorial Hall, Camb. st., | 4-in. |
| " " | Observatory, Concord ave., | 1-in. |
| " " | Semitic Mus., Divinity ave., | 4-in. |
| Holy Ghost Hospital for Incurables, | Hovey avenue, | 3-in. |
| Houghton, Mifflin & Co., | Albro & Blackstone sts., | 6-in. |
| " " " " | River street, | 6-in. |

| | | |
|--|--|---------------|
| Irving & Casson, | Otis street, | 6-in. |
| " " | Thorndike street, | 6-in. |
| " " | Thorndike street, | 2-in. |
| Ivers & Pond Piano Co., | Albany street, | 4-in. |
| Jones, C. L. & Co., | Pearl street, | 4-in. |
| Keeler & Co., | Thorndike street, | 1-in. |
| Kendall, Edward, & Sons, | Main street, | 2-in. |
| Lamb & Ritchie, | Albany street, | 6-in. |
| Laminar Fibre Co., | Tannery street, | 2-in. |
| Liquid Air, Power & Automobile Co., | Albany street, | 4-in. |
| Lockhart, William L., | Bridge street, | 1 1-2-in. |
| Luke, E. H., Est. of, | Main street, | 2-in. |
| Mason & Hamlin Co., | Broadway, | Two 6-in. |
| Massachusetts Athletic Association, | Lansdowne street, | 4-in. |
| Met. Storage Warehouse Co., | Massachusetts ave., | 6-in. |
| Middlesex Co'y, House of Correction, | Second & Spring streets, | 6-in. |
| National Biscuit Co., | Franklin street, | 4-in. |
| " " " | Green street, | 8-in. |
| National Linseed Oil Co., | Fifth street, | 6-in. |
| North Packing & Provision Co., | Winter street, | 6-in. |
| O'Brien, John (Rev.) | Seventh street, | 4-in. |
| Page, George G., Box Co., | Hampshire street, | 6-in. & 4-in. |
| Pettersen, Oscar G., | 483 Main street, | 4-in. |
| Pi Eta Club, | Winthrop street, | 2-in. |
| Porter, Henry S., | Kinnaird street, | 4-in. |
| Reardon, John, & Sons, Corporation, | Waverly street, | 4-in. |
| Revere Sugar Refinery, | Water street, | 6-in. |
| Reversible Collar Co., | Putnam avenue, | 6-in. |
| Russell, Lucy J., | 29 Elm street, | 1 1-2-in. |
| Sawyer, Howard M., & Son, | Thorndike street, | 4-in. |
| Seavey Manufacturing Co., | Third street, | 6-in. |
| Seelye Manufacturing Co., | First street, | 4-in. |
| Simplex Electrical Co., | Auburn street, | 3-in. |
| " " " | Auburn street, | 6-in. |
| " " " | Franklin street, | 6-in. |
| Slavens, Luther R., | Broadway, | 2-in. |
| Smart, Charles E., | Main street, | 2-in. |
| Sparrow, H. F., & Co., | Hampshire street, | 6-in. |
| Speare's, Alden, Sons & Co., | Rogers street, | 4-in. |
| " " " " | Sixth street, | 4-in. |
| Standard Oil Co., | Potter street, | 6-in. |
| Thayer, Henry, & Co., | Broadway, | 6-in. |
| Tower, Sylvester, & Son, | Broadway, | 4-in. |
| University Associates, | Linden street, | 4-in. |
| University Press, | Nutting Place, | 6-in. |
| Wetmore, C. D., | Claverly Hall, Mt. Auburn st., | 4-in. |

DRINKING FOUNTAINS.

There are twenty-eight (28) drinking fountains in use; four (4) of these are ice water drinking fountains of Jenk's manufacture.

These ice water drinking fountains were supplied with ice from June 13th to October 1st at a cost of four hundred forty-seven dollars and eleven cents (\$447.11).

This date (June 13th) is one month later than usual but as there had been no appropriation made for this expenditure the Water Board did not feel authorized to incur the expense until June, when the City Council made an appropriation for five hundred dollars (\$500.00).

The fountains in the locations following have been repaired: Brookline Street at Putnam Avenue, Central Square, Kendall Square, Massachusetts Avenue and Peabody Street.

STREET WATERING STANDPIPES.

No addition has been made during the year to the number of standpipes; there are fifty-nine (59) in use.

When the standpipes were put into commission in the spring the cost of repairs on valves made necessary by exposure to frost was met by the Street Department, it being considered responsible for the negligence of its drivers.

The standpipes have been removed from Cambridge Street at Oak Street and set on Cambridge Street near Inman Square and from Henry Street at Brookline Street and set on Henry Street about one hundred fifty-five (155) feet from Brookline Street.

Outside of the annual inspection and repair of street watering standpipes, the standpipes in the following locations have received additional repairs: Broadway and Sixth, Broadway and Third, Prison Point Street, Putnam Avenue and Magee, Putnam Avenue and River, Massachusetts Avenue at Dudley Street, Massachusetts Avenue at Franklin Street.

GATES.

Thirty-six (36) gates have been set during the year as follows:

Twenty-one (21) on extension of main pipes. (See tables on pages 27 and 38).

Ten (10) on renewal of main pipes. (See above tables).

Five (5) on new supplies. (See table on page 38).

In the locations following the gates have been repaired: Ash Street at Acacia Street, Main Street at Osborn Street, Massachusetts Avenue at Walden Street, Pleasant Street at River Street, Reservoir Street, Washington Street at Hillside Avenue.

A thorough inspection of the gates has been made and their locations, carefully marked.

MIXER.

The total number of boxes set during the year was two hundred and twenty (220).

Twenty-seven (27) iron and six (6) small wooden boxes have been set in the new extension and renewal work.

Four (4) iron and nine (9) small wooden boxes have been set on new extension work.

Forty-two (42) boxes have been set in place of worthless ones. There are thirty-eight (38) iron, two (2) hydrant, one (1) large wooden and six (6) small wooden.

There are seventy-five (75) meter boxes and one (1) large wooden box set in connection with the setting of meters.

At seven (7) locations the boxes have been repaired.

At one (1) location on Hovey Avenue a meter box has been removed.

At twenty-two (22) locations the gate boxes have been raised, in twenty (20) locations the gate boxes have been lowered and in six (6) locations the gate boxes have been reset to conform to the street grade.

HYDRANTS

The number of hydrants in use at date, November 30, 1901, is nine hundred and eighty-eight (988).

Twenty-five (25) pumps (Chapman) and three (3) flush hydrants have been set during the year. The table of "main pipe laid, hydrants set" is on page 37.

Four (4) pumps and twelve (12) flush hydrants have been removed during the year as follows: Flush pump from Austin Street corner Temple Street. Flush pump from Auburn Street corner Main Street. Chapman pump from 100 North Avenue at Broadway. Flush pump from Grant Street corner of Street. Flush pump from Norris Street, midway. Perkins pump from 100 North Street. This hydrant was broken by a team and flush hydrant has been removed from Birch Street and Massachusetts Avenue. Hydrants at Ellery Street. Broadway at Quincy Street. Ellery Street. Hydrant located seventy-five (75) feet from Broadway. Garden Street. Near Walter Street. Massachusetts Avenue near Kensington Street. At Auburn Street opposite Athens Street. At Auburn Street at

Bow Street; Mt. Auburn Street corner Dunster Street; Rice Street, five hundred forty (540) feet from Massachusetts Avenue; Walker Street, two hundred seventy (270) feet from Shepard Street; and Western Avenue at Putnam Avenue.

Total number and kind of hydrants in use are as follows :—

| | |
|-------------------|-----|
| Boston | 157 |
| Chapman | 481 |
| Coffin | 41 |
| Flush | 119 |
| Holyoke | 86 |
| Perkins | 94 |
| <hr/> | |
| Total | 978 |

Hydrants in the locations following have been raised :— Hovey Avenue, Hampshire and Amory Streets; in Douglass Street at Austin Street the hydrant has been lowered.

Posts have been set to protect the hydrants located at the corner of Bent Street and Ninth Street, and Bent Street and Fifth Street.

The hydrants located as follows, have received necessary repairs :— Gore Street at Seventh Street; Harvard Square opposite Dunster Street; Massachusetts Avenue at Frank Street; Ninth Street and Bent Street; Tannery Street at Cambridge City Home; Thorndike Street at House of Correction (this hydrant has been repaired twice at the County's Expense); University Press; Walden Street at Raymond Street.

The Coffin hydrant in Portland Street, near Main Street, and the Boston hydrant in Brookline Street near Henry Street have been relocated.

The annual inspection of hydrants has been made.

METERS.

There have been set ten hundred seventy (1070) meters in new locations during the year.

Early this year the Board decided to place meters on as many of the dwellings in the several wards as the amount of the appropriations would warrant; accordingly a specification was prepared and bids asked for, resulting in the contract being awarded to the Hersey Manufacturing Company of Boston, for its all-composition disc meters to the number of

one thousand 1,000. The work of setting them began on June 15th and a few days later there had been set from the list prepared by the Water Department of the direction of the Water Board, eight hundred thirty one 831 meters, of sizes from five eighths inch to one and one half inch. Of these 831 meters thirty six 36 were Hersey discs, one 1 Union, one 1 Lambert and one 1 Trident completed the total number of meters set.

Of these 831 were set on Houston Street, thirty three 33 were set on Washington Street, thirty one 31 were set on Cambridge Street, thirty one 31 were set on Orange Street, forty 40 were set on Broadway Street, 15 were set on Harvard Street, eighty eight 88 were set on Mass. Street, two hundred thirteen 113 were set on Essex Street, one hundred eight 108 were set on Prospect Street, and 92 were set on Western Avenue.

The cost of the work has been ten thousand eight hundred and seventy five dollars \$10,875, an average of twelve dollars and two cents per meter.

The cost is larger than it would be for other parts of the City, as the cost of the meters required setting in the sidewalk one hundred and thirty one 131 of the total number being replaced.

The cost of the meters was set in response to get the meter and from the cost of the work.

The cost of the work of pressing the 831 meters and meters have been charged to the City of New York, with good results.

At the present time, eighteen 18 street ninety eight 98 meters of the City of New York are set in the City.

| | | | |
|----------------|-----|---------------|-----|
| Hersey | 36 | Union | 1 |
| Lambert | 1 | Trident | 1 |
| Essex | 108 | Mass. St. | 113 |
| Prospect | 92 | Western Ave. | 92 |
| Washington St. | 31 | Cambridge St. | 31 |
| Houston St. | 33 | Orange St. | 40 |

The total number of meters set in the City of New York is 831.

STONY BROOK

The work of setting meters in the City of New York has been completed. The cost of the work has been ten thousand eight hundred and seventy five dollars \$10,875, an average of twelve dollars and two cents per meter.

HOBBS BROOK.

The height of water in this basin is at present 179.25 feet — 1.75 below high water. Water was drawn from here from February 26 to March 14, from July 21 to August 8, from August 14 to 26, and from September 7 to date, November 30, 1901.

It was hoped that this season would be favorable for doing quite an amount of ditching in the meadows at the upper part of the basin, but the height of the water has prevented doing as much as we had wished; however, the Brook has been partly cleaned and we are in hopes to have the ditches on the Evans farm cleaned before spring.

The brush along the fence has been cut and burned and the standing grass sold.

A twelve-inch drain from the lower side of Winter Street Dam to opposite the Stearns place has been in course of construction for the past month, more than half of the work is finished and a few weeks more

REPORT OF THE PUMPING ENGINEER

CAMBRIDGE, December 2, 1901.

To the Honorable, the Water Board of the City of Cambridge.

GENTLEMEN:—I would report that the Leavitt engine No. 7, has pumped all the water used by the City the past year, without any expense for repairs.

Worthington engines Nos. 1 and 2, and Blake engine No. 6, have not been started the past year except to move them by water pressure weekly, for safety.

The fire-room walls have been painted two coats of cold water paint and the boiler covering and all the iron work two coats of lead and oil. This has been done by the employees at the Station at a cost for material only.

The machinery and fixtures at the Station are in first-class condition.

The shower bath which was put in the fire-room the past year has proved a great benefit to the employees in warm weather and been appreciated by them.

You will notice by the pumping record quite a difference in duty between the first six months and the remainder of the year, in favor of coal by cargo over that teamed which runs very unevenly as to quality and dryness.

Respectfully submitted,

(Signed)

E. I. HARRIS,
Chief Engineer.

OPERATING EXPENSES AT PUMPING STATION

| | |
|-------------------------|-------------|
| Oil | \$5,125.75 |
| Electricity Work | 11.86 |
| Repairs | 28.16 |
| Grease | 49.80 |
| Lighting | 27.00 |
| Grease and packing | 323.07 |
| Insurance | 351.82 |
| Telephone | 11.65 |
| Carriage and horse hire | 24.11 |
| Transportation | 108.00 |
| Transportation water | 208.31 |
| Miscellaneous | 87.15 |
| Subtotal | \$8,018.58 |
| | \$13,020.49 |

MONTHLY RECORD POND LEVELS AND RAINFALL

| Date | Rainfall (Inches) | | Total Water Pumped | | Total Cost Consumed | | Average Height of Pond | |
|-----------|-------------------|------|--------------------|--------|---------------------|--------|------------------------|--------|
| | Month | Year | Feet | Inches | Feet | Inches | Feet | Inches |
| January | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| February | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| March | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| April | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| May | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| June | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| July | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| August | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| September | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| October | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| November | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| December | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |
| Total | 1911 | 11 | 720 | 00.00 | 110 | 00 | 15 | 00 |

REPORT OF THE COMMISSIONERS OF THE SINKING FUNDS OF THE CITY OF CAMBRIDGE

To the Honorable, the City Council :—

The undersigned, Commissioners of the Sinking Funds of the City of Cambridge, herewith submit the annual report of the Water Works Sinking Fund committed by law to their charge. The report covers the year ending November 30, 1901.

The following statement shows the present condition of the Water Loan Sinking Fund :—

| Dr. | | | |
|---|---|---|---------------------|
| Amount of the Fund, November 30, 1900 | . | . | \$604,326 58 |
| Received during the year as follows:— | | | |
| From the Treasurer of the City of Cambridge, the annual required appropriation from the water rates, viz. | . | . | 122,352 80 |
| From the sale of the old reservoir site | . | . | 13,278 67 |
| From interest on investments | . | . | 23,807 90 |
| | | | <u>\$763,765 95</u> |
| Cr. | | | |
| Amount paid for accrued interest on investments purchased | . | . | \$868 42 |
| Amount paid for premiums on investments purchased | . | . | 5,165 99 |
| Leaving the amount of the Fund, November 30, 1901. | . | . | 757,731 54 |
| | | | <u>\$763,765 95</u> |

FRANK A. ALLEN,
JOHN C. BULLARD,
GEORGE H. HOWARD,
ANDREW J. LOVELL,
J. HENRY RUSSELL,
DANA W. HYDE,

}
Commissioners
of the
Sinking Funds
of the City
of Cambridge.

The following are the investments belonging to the Funds :—

| | | | | | |
|------------------------|------|-----------|---------------|---------|---------------------|
| Cambridge | City | bonds 4s, | Maturing Feb. | 1, 1913 | \$2,000 00 |
| " | " | " 4s, | " Oct. | 1, 1916 | 65,100 00 |
| " | " | " 3 1-2s, | " Dec. | 1, 1917 | 40,000 00 |
| " | " | " 3 1-2s, | " Nov. | 1, 1919 | 20,000 00 |
| " | " | " 4s, | " Nov. | 1, 1920 | 5,000 00 |
| Lynn | " | " 4s, | " Jan. | 1, 1905 | 19,000 00 |
| Wakefield | Town | " 4s, | " Oct. | 1, 1905 | 5,000 00 |
| Amount carried forward | | | | | <u>\$156,100 00</u> |

Amount brought forward

\$124,100 00

| | | | | | |
|-----------|--|---|-------|---------------|-------------|
| Amount on | Town bonds \$15,000 Maturing Apr 1, 1905 | | | | \$20,000 00 |
| Amount on | City | " | 30 | July 1, 1905 | 20,000 00 |
| Amount on | Town | " | 31 20 | Sept 10, 1905 | 2,000 00 |
| Amount on | " | " | 00 | Oct 1, 1905 | 4,000 00 |
| Amount on | City | " | 00 | Nov 1, 1905 | 3,000 00 |
| Amount on | " | " | 31 20 | Nov 15, 1905 | 2,000 00 |
| Amount on | Town | " | 00 | Oct 1, 1907 | 4,000 00 |
| Amount on | City | " | 00 | Nov 1, 1907 | 4,000 00 |
| Amount on | " | " | 31 20 | Nov 15, 1907 | 2,000 00 |
| Amount on | Town | " | 00 | May 1, 1908 | 1,000 00 |
| Amount on | " | " | 00 | Aug 1, 1908 | 10,000 00 |
| Amount on | " | " | 31 20 | Oct 15, 1908 | 4,000 00 |
| Amount on | City | " | 00 | Nov 1, 1908 | 4,000 00 |
| Amount on | " | " | 31 20 | Nov 15, 1908 | 2,000 00 |
| Amount on | Town | " | 31 20 | Dec 1, 1908 | 12,000 00 |
| Amount on | City | " | 31 20 | Feb 1, 1909 | 14,000 00 |
| Amount on | Town | " | 00 | Aug 1, 1909 | 15,000 00 |
| Amount on | " | " | 31 20 | Oct 15, 1909 | 4,000 00 |
| Amount on | City | " | 00 | Nov 1, 1909 | 3,000 00 |
| Amount on | " | " | 31 20 | Nov 15, 1909 | 2,000 00 |
| Amount on | " | " | 31 20 | June 1, 1910 | 21,000 00 |
| Amount on | " | " | 00 | July 1, 1910 | 4,000 00 |
| Amount on | Town | " | 31 20 | Oct 15, 1910 | 4,000 00 |
| Amount on | City | " | 31 20 | Nov 15, 1910 | 2,000 00 |
| Amount on | " | " | 31 20 | June 1, 1911 | 25,000 00 |
| Amount on | Town | " | 31 20 | Oct 15, 1911 | 12,000 00 |
| Amount on | City | " | 31 20 | Nov 15, 1911 | 2,000 00 |
| Amount on | " | " | 31 20 | Apr 1, 1912 | 10,000 00 |
| Amount on | Town | " | 00 | Oct 1, 1912 | 1,000 00 |
| Amount on | City | " | 31 20 | Nov 15, 1912 | 2,000 00 |
| Amount on | " | " | 31 20 | Nov 15, 1913 | 2,000 00 |
| Amount on | " | " | 1 20 | Nov 15, 1914 | 2,000 00 |
| Amount on | " | " | 00 | Jan 1, 1915 | 14,000 00 |
| Amount on | Town | " | 31 20 | May 1, 1915 | 2,000 00 |
| Amount on | City | " | 31 20 | Nov 15, 1915 | 2,000 00 |
| Amount on | Town | " | 31 20 | May 1, 1916 | 2,000 00 |
| Amount on | " | " | 00 | Mar 1, 1917 | 2,000 00 |
| Amount on | City | " | 00 | Apr 1, 1917 | 24,000 00 |
| Amount on | Town | " | 1 20 | May 1, 1917 | 2,000 00 |
| Amount on | City | " | 00 | Jan 1, 1918 | 15,000 00 |
| Amount on | Town | " | 00 | Mar 1, 1918 | 1,000 00 |
| Amount on | " | " | 1 20 | May 1, 1918 | 2,000 00 |
| Amount on | " | " | 31 20 | May 1, 1919 | 2,000 00 |
| Amount on | " | " | 31 20 | May 1, 1920 | 2,000 00 |
| Amount on | City | " | 00 | Aug 1, 1920 | 25,000 00 |
| Amount on | City | " | 31 20 | Oct 1, 1920 | 5,000 00 |
| Amount on | City | " | 00 | May 1, 1921 | 2,000 00 |
| Amount on | " | " | 00 | May 1, 1922 | 1,000 00 |
| Amount on | " | " | 00 | May 1, 1923 | 2,000 00 |
| Amount on | " | " | 00 | May 1, 1924 | 2,000 00 |
| Amount on | " | " | 00 | May 1, 1927 | 2,000 00 |
| Amount on | Town | " | 00 | July 1, 1927 | 10,000 00 |
| Amount on | City | " | 00 | May 1, 1928 | 2,000 00 |

\$124,100 00

Amount brought forward

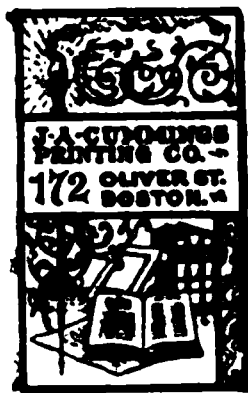
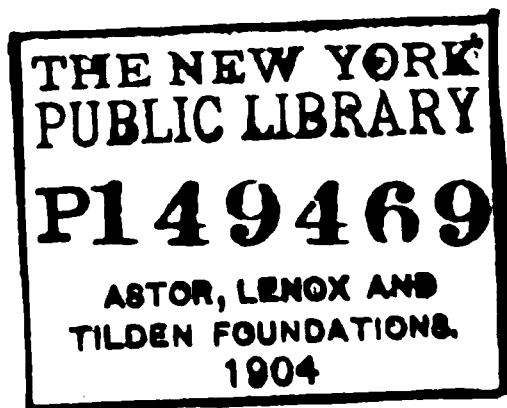
\$124,100 00

COMMISSIONERS OF SINKING FUNDS.

| | | | | | | | |
|-------------------------------|--------------------|----------|------|---------|--|------------|---------------------|
| <i>Amount brought forward</i> | | | | | | | \$615,400 00 |
| Winchester | Town bonds 4s, | Maturing | June | 1, 1928 | | \$6,000 00 | |
| Quincy | City " 4s, | " | May | 1, 1929 | | 3,000 00 | |
| Fall River | " " 3 1-2s, | " | Nov. | 1, 1929 | | 75,000 00 | |
| Quincy | " " 4s, | " | May | 1, 1930 | | 3,000 00 | |
| " | " " 4s, | " | May | 1, 1931 | | 3,000 00 | |
| " | " " 4s, | " | May | 1, 1932 | | 1,000 00 | |
| Newton | " " 4s, | " | Aug. | 1, 1935 | | 2,000 00 | |
| " | " " 4s, | " | July | 1, 1936 | | 11,000 00 | |
| Grafton | Town " 3 1-2s, | " | July | 1, 1937 | | 1,000 00 | |
| Old Colony R. R. Co. | | 4s, | Jan. | 1, 1938 | | 25,000 00 | |
| Grafton | Town bonds 3 1-2s, | " | July | 1, 1938 | | 2,000 00 | |
| " | " " 3 1-2s, | " | July | 1, 1939 | | 2,000 00 | |
| | | | | | | | <u>\$134,000 00</u> |
| | | | | | | | 749,400 00 |
| Cash deposited in bank | | | | | | | <u>8,331 54</u> |
| | | | | | | | <u>\$757,731 54</u> |

The Bonded Water Debt, which the foregoing Fund is to pay, matures as follows:—

| | | |
|---------------|----------|----------------------|
| Nov. 1, 1906 | 3 1-2s . | \$43,000 00 |
| Oct. 1, 1907 | 4s . | 90,000 00 |
| Nov. 1, 1907 | 4s . | 22,000 00 |
| July 1, 1908 | 4s . | 46,000 00 |
| Aug. 1, 1908 | 4s . | 25,000 00 |
| July 1, 1909 | 4s . | 20,000 00 |
| May 1, 1910 | 4s . | 288,000 00 |
| July 1, 1910 | 4s . | 75,000 00 |
| Sept. 1, 1910 | 4s . | 125,000 00 |
| Jan. 1, 1911 | 4s . | 20,000 00 |
| Oct. 1, 1911 | 4s . | 35,000 00 |
| Jan. 1, 1912 | 4s . | 150,000 00 |
| May 2, 1912 | 4s . | 75,000 00 |
| Nov. 1, 1912 | 4s . | 45,000 00 |
| Feb. 1, 1913 | 4s . | 100,000 00 |
| Aug. 1, 1913 | 4s . | 50,000 00 |
| Apr. 1, 1915 | 4s . | 200,000 00 |
| Aug. 1, 1915 | 4s . | 200,000 00 |
| Apr. 1, 1916 | 4s . | 100,000 00 |
| July 1, 1916 | 4s . | 200,000 00 |
| Aug. 1, 1916 | 4s . | 100,000 00 |
| Oct. 1, 1916 | 4s . | 265,100 00 |
| Apr. 1, 1917 | 3 1-2s . | 200,000 00 |
| July 1, 1917 | 3 1-2s . | 100,000 00 |
| Nov. 1, 1917 | 3 1-2s . | 75,000 00 |
| Dec. 1, 1917 | 3 1-2s . | 140,000 00 |
| May 2, 1918 | 3 1-2s . | 50,000 00 |
| June 1, 1918 | 3 1-2s . | 60,000 00 |
| Nov. 1, 1918 | 3 1-2s . | 50,000 00 |
| Nov. 1, 1919 | 3 1-2s . | 23,000 00 |
| Nov. 1, 1920 | 3 1-2s . | 30,000 00 |
| July 1, 1921 | 3 1-2s . | 30,000 00 |
| Apr. 1, 1924 | 4s . | 300,000 00 |
| | | <u>\$3,332,100 0</u> |



CAMBRIDGE WATER BOARD

1903

President.

WILLIAM B. DURANT

Members of the Board.

| | |
|----------------------------|-------------------|
| JOHN F. KELLEY | Term expires 1902 |
| WILLIAM S. FILLMORE | Term expires 1903 |
| EDWARD STEVENS | Term expires 1904 |
| JOHN B. HOWARD | Term expires 1905 |
| WILLIAM B. DURANT | Term expires 1906 |

WALTER H. HARDING, Clerk

Superintendent of Works.

EDWIN C. BROOKS

Water Registrar.

WALTER H. HARDING.

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-1902.

| | | |
|-------------------------------|--------------------------|-----------------|
| CHESTER W. KINGSLEY . . . | 1865-1894 | |
| JOHN SARGENT | 1865-1871 | |
| A. K. P. WELCH | 1865-1871 | |
| ROBERT DOUGLASS | 1865-1871 | |
| SAMUEL SLOCOMB | 1865-1876 | |
| Z. L. RAYMOND | 1871 | |
| HENRY L. EUSTIS | 1871-1885 | |
| J. WARREN MERRILL | 1871-1881 | |
| GEORGE P. CARTER | 1871-1883 | |
| JOHN H. LEIGHTON | 1876-1879 | |
| KNOWLTON S. CHAFFEE | 1879-1889 | |
| JAMES M. W. HALL | 1881-1899 | |
| LEANDER M. HANNUM | { 1883-1884
1885-1893 | |
| JOHN F. O'BRIEN | 1884-1895 | |
| GEORGE H. HOWARD | 1889- | (Now in Office. |
| E. BURT PHILLIPS | 1893-1896 | |
| STILLMAN F. KELLEY | 1894- | (Now in Office. |
| FRANK A. ALLEN | 1895-1899 | |
| WELLINGTON FILLMORE | 1896- | (Now in Office. |
| EDMUND H. STEVENS | 1899- | (Now in Office. |
| WILLIAM B. DURANT | 1899- | (Now in Office. |

Presidents of the Board.

| | |
|-------------------------------|-----------|
| J. WARREN MERRILL | 1865-1867 |
| ERZA PARMENTER | 1867 |
| JOHN SARGENT | 1867-1871 |
| J. WARREN MERRILL | 1871-1873 |
| CHESTER W. KINGSLEY | 1873-1876 |
| GEORGE P. CARTER | 1876-1883 |
| CHESTER W. KINGSLEY | 1883-1894 |
| JAMES M. W. HALL | 1894-1899 |
| WILLIAM B. DURANT | 1899- |

REPORT OF THE CAMBRIDGE WATER BOARD

CAMBRIDGE, December 13, 1902.

To the Honorable the City Council of the City of Cambridge

The thirty eighth annual report of the Cambridge Water Board, for the year ending November 30, 1902, is hereby submitted for your consideration.

The several reservoirs of the City, with the appurtenances, including the basins of Holden Brook, and of Stony Brook, the main supply main and distributing pipes, pumping station, engines and boilers, and other machinery and appliances, are all in good order and condition and equal to the high standard of previous years. Repairs have in some cases become necessary, especially upon a portion of the main supply pipe from Holden Brook, and an allowance for such repairs will have to be made in the appropriation for maintenance for the ensuing year.

A few suits for damages for land taken, and for damage to land, are now pending, and it is hoped that these suits will be adjusted during the coming year. When they shall be adjusted, an appropriation for Construction Account will have to be made and provided for, by the issue of bonds as usual.

FINANCIAL STATEMENT IN BRIEF

| | |
|---|----------------|
| The total cost of the Water Works to November 30, 1901, was | \$1,702,030 00 |
| There was expended during the year on Construction Account | 71,073 87 |
| The total cost to November 30, 1902, was | \$1,773,103 87 |

WATER DEBT ACCOUNT

| | |
|---|----------------|
| The entire amount of bonds outstanding is | \$1,300,000 00 |
| deducting from this sum the present value of the Water Debt Sinking Fund, exclusive of the note of the City for \$200,000 | 107,000 00 |
| leaves as the net Water Debt | \$1,193,000 00 |

For further details of the financial condition of the department, reference may be made to the statement of the Registrar appended to this report. From that statement it appears that the excess of receipts over expenditures during the past year is the sum of

\$2,171 84

FRESH POND.

In making up the annual estimates for the year, the Board recommended an appropriation of \$10,000, for the purpose of completing in part the unfinished work around Fresh Pond, in the vicinity of the corner of Concord Avenue, at and near the corner of Huron Avenue. This work has been done in a thorough and substantial manner, and in accordance with the original designs of Messrs. Olmsted Brothers, the landscape gardeners, who have planned other improvements heretofore made at Fresh Pond, and the result has been a great increase in the beauty of the landscape, and has been much commended by all who have visited the place.

It is admitted by those interested in park work, that the Fresh Pond surroundings have the best natural advantages for park improvement of anything in the Metropolitan Park District, and all that is needed to complete the work is the necessary funds. When this task is finally completed we shall not only have something of which Cambridge may well be proud, but also a great contribution to health in that locality, for in the course of this work, the low, marshy, malarial lands adjoining the Pond, are being filled to a level that removes all danger of malaria, mosquitoes, and everything detrimental to good health. If this City is to have parks it would seem the height of folly not to finish the Fresh Pond Park System, especially since the land is already owned by the City. Fresh Pond Park is, in area, considerably more than one-half of the whole park system of the City.

It should also be borne in mind that, since the park work was begun in 1896, all the expense connected with the work has been paid out of surplus water receipts, and none of it from the general tax levy. Moreover the money expended on this improvement is all expended for labor, performed by the laboring men of Cambridge. It is earnestly hoped that this work may be advanced more rapidly in the future, and especially that Kingsley Park may be finished from the next appropriation for this purpose.

WATER BASINS.

On the first day of December, 1901, the water in Hobbs Brook Reservoir was one foot nine inches below high water mark, Stony Brook

was overflowing the dam and Fresh Pond was about two feet below high water mark. On the first day of December, 1902, the water in Holden Brook Reservoir was two and one-half feet below high water mark, Stony Brook Reservoir was four inches below high water mark, and Fresh Pond was three feet three inches below high water mark. The shrinkage in Fresh Pond is an immediately alarming, but deserves careful consideration in view of the increased total consumption of water, hereinbefore referred to, and especially in view of the fact that the main supply pipe from Water Brook to Fresh Pond, has been delivering water to the Pond at its normal capacity, during the whole year, and yet it is impossible to keep the Pond full.

STONY BROOK OVERFLOW.

The overflow at Stony Brook, which, as the City Council is aware, occurs almost daily in the Winter and Spring, and which runs to waste in the brook, is due for the reason that there is no storage basin below the dam above Fresh Pond, and no pipe sufficient to carry the water to it. The amount of water lost for the year ending December 1, 1902, was estimated at

6,539,100,000 gallons.

The amount of water lost in 1901 was

6,141,000,000 "

The amount lost in 1900 was

6,077,000,000 gallons.

It is estimated that there is no possibility of constructing a storage basin below the dam at Stony Brook and Fresh Pond, and that the only way to keep Fresh Pond supplied in extent otherwise, when a new pipe is put in, is to have a pipe that will become necessary in the future, and a portion of the water so wasted could be saved.

RESULTS OF EXAMINATION OF WATER FROM FRESH POND

APRIL 10 TO 11, 1900

Feet per 24 hours

| | Free
Surface | Under
Pressure | Surface
Temperature | Under
Pressure |
|------|-----------------|-------------------|------------------------|-------------------|
| 4:00 | 10.10 | 10 | 62.5 | 62.5 |
| 5:00 | 10.11 | 10 | 62.5 | 62.5 |
| 6:00 | 10.12 | 10 | 62.5 | 62.5 |
| 7:00 | 10.13 | 10 | 62.5 | 62.5 |
| 8:00 | 10.14 | 10 | 62.5 | 62.5 |
| 9:00 | 10.15 | 10 | 62.5 | 62.5 |

WATER BOARD.

| | Free
Ammonia. | Chlorine. | Nitrogen as
Nitrates. Nitrites. | |
|----------------------------------|------------------|-----------|---|-------|
| 1899..... | .0048 | .56 | .0332 | .0005 |
| 1900..... | .0088 | .54 | .0128 | .0005 |
| 1901..... | .0026 | .54 | .0323 | .0003 |
| 1902 (11 months)..... | .0047 | .55 | .0316 | .0004 |
| Average for past 10 years | .0057 | .61 | .0275 | .0005 |
| For two years ending May 6, 1889 | .0134 | 1.37 | .0281 | .0007 |

The above analyses indicate that the quality of the water in Fresh Pond has suffered no deterioration during the last ten years, and it may be added, that it compares very favorably with the water supplies of most other cities. The analysis of the two-year period ending May 6, 1889, is added, to show the progress made since that date.

The amount of chlorine in the water is one of the most conclusive indications of pollution or non-pollution; reference being had, of course, to the normal chlorine of the district. The normal chlorine at Fresh Pond is 0.45. The above table shows great improvement in that respect since 1889. The free ammonia, also an item of suspicion, has been greatly reduced since that date. The normal chlorine of Fresh Pond is taken from the map of normal chlorines, or isochlors, annexed to the Report of the State Board of Health for the year 1890.

RAIN-FALL.

The annual rain-fall for the past ten years at Fresh Pond is as follows : —

| | Inches. |
|-------------------|---------|
| 1893 | 40.49 |
| 1894 | 35.85 |
| 1895 | 47.12 |
| 1896 | 38.82 |
| 1897 | 42.53 |
| 1898 | 52.42 |
| 1899 | 37.28 |
| 1900 | 46.89 |
| 1901 | 46.20 |
| 1902 | 43.31 |
| Average | 43.09 |

The rain-fall for the year at Hobbs Brook was 42.24 inches; at Stony Brook, 44.58 inches.

CONSUMPTION OF WATER.

| | |
|---|-----------------------|
| The total consumption of water for the year ending December 1, 1902, was | 2,937,513.543 gallons |
| For the year ending December 1, 1901 | 2,795,124.600 " |
| Increase of consumption this year | 142,388.943 gallons |
| The amount of consumption in the year ending December 1, 1902, over the year ending December 1, 1901, was | 142,388.943 " |
| Difference between amount of 1902 over amount of 1901. | 11,317,908 gallons |

In 1897 the total consumption was 1,961,462.760 gallons. The amount of increase, since that year is fully shown in the Report of the Engineer, herewith filed.

These figures deserve careful study, and ought to impress upon the community the fact which the Board has heretofore repeatedly urged upon governing City governments, namely, that something must be done to increase the supply at Fresh Pond, or diminish the consumption of water by checking waste. Before many years, both methods must be adopted. The idea that water is as abundant as air, to be used as lavishly, and wasted at pleasure, has long been exploded. Inasmuch as the Metropolitan Board, having under their control the Nashua River, and the enormous mass which they have constructed among the hills of Worcester County, are already apprehending a scarcity of water, and are recommending the general use of meters in order to check unnecessary consumption, it is the responsibility of Cambridge not to neglect the lesson. The Board do not enjoy the role of Cassandra all the time, but would be derelict in their duty if they did not repeat what they have said in previous reports and recommendations, that something ought to be done at once, to adjust the capacity of our water supply to the increasing demands of the growing population of the City.

PER CAPITA CONSUMPTION OF WATER.

| | |
|---|---------------|
| The daily per capita consumption of water, including unmetered and unmetered water, in 1902 was | 63.77 gallons |
| The daily per capita consumption of water, including unmetered and unmetered water, in 1901 was | 61.07 " |
| Increase | 2.70 gallons |
| The daily per capita consumption of metered water in 1902 was | 57.57 gallons |
| The daily per capita consumption of metered water in 1901 was | 51.23 " |
| Increase | 6.34 gallons |

These figures include both water used for domestic purposes and water used for manufacturing purposes (which latter is all metered).

The total consumption of metered water used for business purposes only, during the year 1902, was 110,903,000 gallons in excess of such consumption in 1901, indicating that the most of the increase of total consumption for the year was due to increased use of water in manufacturing. This excess is equal to a consumption *per capita* of 3.54 gallons, which nearly accounts for the increase *per capita* of metered water above shown; *viz.*, 4.15 gallons.

A separate canvass of 812 domestic meters set last year, covering a population of 8,407, shows that the daily *per capita* consumption of water used for domestic purposes only, was 35.87 gallons.

These figures indicate plainly enough, what has never been questioned by any one familiar with the subject, that the use of meters greatly decreases waste of water.

The Board have corresponded with the Water Boards of many cities and towns using meters, and their testimony is uniformly to that effect. The correspondence is at the service of any member of the City Government, but is too voluminous to be inserted in this report. Among the cities and towns reporting a reduction in the consumption of water, as the result of setting meters, are the cities of Brockton, Brookline, Fitchburg, Hartford, Lynn, Lowell, Fall River, Manchester, N. H., New Bedford, Newton, Pawtucket, R. I., Providence, R. I., Springfield, Waltham and Worcester.

The attitude of the Metropolitan Board has already been referred to, and has been approved by Governor Crane, in his message to the General Court of 1902.

A brief extract from the message is as follows : —

“The Water Board last year called attention to the great increase from year to year in the consumption of water in the district, and its successor has begun extended investigations relative to the excessive use and waste of water. This increase not only necessitates a great increase in current expenses, but it hastens the time when still greater expenditures must be incurred, not only for new sources of supply, but also for new pumping facilities, new aqueducts, and new pipe mains. There is undoubtedly a considerable consumption of water which is excessive and wasteful, and which can be prevented. Some method should be devised

in every city and town, if not every individual water taker, shall be interested in the prevention of waste, and of excessive use of water.

Meters have been introduced into some municipalities with beneficial effect. It is now worthy of consideration, whether the use of meters, which in some parts ought not to be compelled, or at least whether some other system may not be adopted, whereby municipalities and water takers may be encouraged in the use of meters, by the promise of financial advantage.

The Chief Engineer of the Metropolitan Board, in his annual report for 1890 says:

"It is time that measures should be taken to prevent or restrict the excessive and wasteful use of water, and there is no method by which this can be done so effectually, as by providing that water shall be furnished to every water taker through a meter. Some legislation should be enacted whereby the several cities and towns shall be induced, or required, to introduce meters so that, at the end of ten years, all or nearly all of the water supplied to takers shall be furnished through meters."

In previous communications to the City Council, the Board have always expressed the same view that the Governor takes in his message, namely, that the excessive use and waste of water hastens the time when greater expenditures must be incurred for new aqueducts and new pipe mains. The longer this time can be postponed, the more saving can be made in expense. If for instance, by the aid of a complete meter system, the laying of a new main pipe from Stony Brook can be postponed for five years, the interest and sinking fund payments for five years, upon the money laid out will be necessarily incurred for such pipe, less the amount of interest saved on the amount of funds raised for meters, will be saved in the end.

The Board at present have, in all, two thousand one hundred and thirty seven meters. If to provide all household supplies with meters, would require about eight thousand additional meters at an estimated cost of about one hundred thousand dollars.

There are at present one fifth of the total number of meters have been connected, by authority of the City Council, and with its approval, a plan is being adopted to complete the work as soon as possible.

Moreover, it may be questioned whether it is fair to charge the water takers having meters, according to meter rates, and the other water takers, schedule rates. If the meters are financially a disadvantage to the consumer, as some claim, one-fifth of the consumers should not be placed in a worse position than the remaining four-fifths. On the other hand, if the meters are financially a benefit (as they certainly are to the careful consumer) the four-fifths are entitled to the same privilege as the one-fifth.

It is plainly just that each water taker should pay only for the water which he uses, and wastes, and should not be obliged, as he now is, (unless he has a meter) to pay also for what his neighbor uses and wastes.

The Water Board unanimously recommend, as the first remedy to be applied, the immediate installation of a complete meter system, and, to that end, advise the appropriation of a sum of twenty-five thousand dollars, to be charged to Water Works Construction Account, and met by an issue of bonds to be paid out of Water Works receipts, in the manner provided by law. This sum will probably provide for all the meters that the Board can set during the year. No new application to the Legislature would be necessary to provide for the issue of bonds for this purpose, as a sufficient number, heretofore authorized, remain unissued.

SECOND REMEDY, NEW PIPE LINE.

If the City Council decide not to concur with the views of the Board, above expressed, immediate provision should be made for a new pipe line from Story Brook to Fresh Pond, so that the Pond may be kept full enough to meet the growing consumption, until the other remedy, a complete meter system, shall also become necessary, as it undoubtedly will. This enterprise will necessarily consume considerable time. The first step must be the presentation to the Legislature, of a petition for the issue of the necessary amount of water bonds, in order to pay for the construction of the line.

Under the joint rule of the two branches of the Legislature, ("12th joint rule,") this petition should be presented before the first Wednesday of February. The petition must be authorized by vote of the City Council. If granted by the Legislature, the next step will be a complete

survey of the line by a competent engineer. This will probably consume at least a year especially as there are some difficult problems to be solved, in connection with such variations from the old route as are sure to be necessary. The proposals for pipe, contracts for pipe, and procuring the pipe will involve a considerable delay, and lastly, the actual construction will probably require another year, possibly two years. Hence the first day is lost to take at once. From estimates made by engineers, the cost of construction including land damages, would not be less than five hundred thousand dollars. Consequently, in the event that the Council sees fit not to make the requisite appropriation for the purchase of meters, the Board recommend the immediate passage of an order, authorizing the Mayor to petition the Legislature for authority to issue bonds to the amount of five hundred thousand dollars, for Water Works Construction, in addition to the amount already authorized, but not issued, according to the provisions of Chapter two hundred and fifty six of the Acts of the year 1904 and the amendments thereto.

During the year, the Board recommended to the City Council, the adoption of the annual charge of \$2 for meter rental, thereby making the net minimum charge for metered water \$5, a charge, as the Board are informed, not less than the average minimum charge for metered water in other cities. This change is especially for the benefit of small consumers and the proposed minimum charge is less than the minimum charge for ordinary domestic use under schedule rates.

The recommendation of the Board was referred to the Committee on Water Supply, who made a favorable report to the City Council, and referred the recommendation to the Committee on Ordinances, which has not yet reported. The Board hope that the City Council will see that this amendment is incorporated into the ordinance early during the coming year.

Respectfully submitted,

WILLIAM B. DURANT,
 STELLMAN F. KELLEY,
 GEORGE H. HOWARD,
 WELLINGTON FILMORE,
 EDMUND H. STEVENS

Control & Water Board

REPORT OF THE WATER REGISTRAR

WATER REGISTRAR'S OFFICE,
CAMBRIDGE, December 3, 1902.

To the Cambridge Water Board:—

GENTLEMEN:—In compliance with the requirements of the City Ordinance I present the thirty-eighth annual report of the operations of this department showing the receipts, expenditures and abatements, together with a statement of the number of water takers, etc., for the year ending November 30, 1902.

Amount of bills remaining unpaid November 30, 1901:—

| | |
|--------------------------------|----------|
| Water rates | \$428 34 |
| Supplies and repairs | 1,004 51 |
| Off and on | 118 00 |
| Seals | 6 00 |
| Maintenance account | 393 91 |

Amount of bills placed in hands of City Treasurer for collection from November 30, 1901, to November 30, 1902:—

| | |
|--------------------------------|--------------|
| Water rates. | \$332,345 99 |
| Supplies and repairs | 4,146 42 |
| Off and on | 504 00 |
| Rents | 168 00 |
| Seals | 111 25 |
| Maintenance account | 1,685 27 |
| Construction account | 827 13 |
| Total bills | \$341,738 82 |

There has been collected:—

| | |
|--------------------------------|--------------|
| Water rates | \$326,500 53 |
| Supplies and repairs | 3,849 15 |
| Off and on | 488 00 |
| Rents | 168 00 |
| Seals | 107 50 |
| Maintenance account | 1,583 30 |
| Construction account | 749 50 |

There has been stated

| | |
|---|------------|
| Water rates of and on and water supplies and repairs,
and construction account | \$3,943 63 |
|---|------------|

There will be collected

| | |
|----------------------|--------------|
| Water rates | \$2,347 12 |
| Supplies and repairs | 1,841 33 |
| of and on | 174 00 |
| Same | 7 23 |
| Maintenance account | 463 84 |
| Construction account | 77 63 |
| | \$341,726 00 |

EXPENDITURES

| | |
|----------------------|-------------|
| Construction account | \$12,741 20 |
| Maintenance account | 63,900 34 |
| | \$76,641 54 |

STATEMENTS

| | |
|--|------------|
| Water rates and supply and repair bills to the amount of | \$3,943 63 |
|--|------------|

RECEIPTS

| | |
|---|--------------|
| Water rates to the amount of | \$3 00 00 |
| Water amounts collected from receipts | 296 300 83 |
| | \$299,300 83 |
| Less the amount of water | \$223,347 20 |
| and of and on the water rates and Maintenance account | 7,346 83 |
| | \$231,953 63 |

OFF AND ON

Water has been set off for non payment of rates, or for other on account of various, and same have been applied to fixtures by request of

| | |
|---|-----|
| Water set off in 1907 | 179 |
| Supplies set off in 1907 | 623 |
| Supplies set off in previous years | 100 |
| Same supplies set off | 160 |
| Same water applied to fixtures in 1907 | 730 |
| Same water returned, put on in 1907 | 200 |
| Same water returned, put on in previous years | 670 |

Statement of yearly revenue received from water rates since the purchase of the works by the City :—

| | |
|--|------------|
| From April 28, 1865, to December 1, 1865 | £32,367 19 |
| From December 1, 1865, to December 1, 1866 | 40,073 27 |
| From December 1, 1866, to December 1, 1867 | 53,733 62 |
| From December 1, 1867, to December 1, 1868 | 63,747 42 |
| From December 1, 1868, to December 1, 1869 | 76,149 30 |
| From December 1, 1869, to December 1, 1870 | 92,605 95 |
| From December 1, 1870, to December 1, 1871 | 111,782 65 |
| From December 1, 1871, to December 1, 1872 | 127,201 30 |
| From December 1, 1872, to December 1, 1873 | 146,117 32 |
| From December 1, 1873, to December 1, 1874 | 153,634 27 |
| From December 1, 1874, to December 1, 1875 | 188,880 37 |
| From December 1, 1875, to December 1, 1876 | 179,166 76 |
| From December 1, 1876, to December 1, 1877 | 154,843 59 |
| From December 1, 1877, to December 1, 1878 | 157,443 91 |
| From December 1, 1878, to December 1, 1879 | 164,681 90 |
| From December 1, 1879, to December 1, 1880 | 173,325 49 |
| From December 1, 1880, to December 1, 1881 | 170,062 73 |
| From December 1, 1881, to December 1, 1882 | 177,430 80 |
| From December 1, 1882, to December 1, 1883 | 179,361 89 |
| From December 1, 1883, to December 1, 1884 | 161,526 27 |
| From December 1, 1884, to December 1, 1885 | 183,544 36 |
| From December 1, 1885, to December 1, 1886 | 199,404 43 |
| From December 1, 1886, to December 1, 1887 | 204,748 64 |
| From December 1, 1887, to December 1, 1888 | 211,156 27 |
| From December 1, 1888, to December 1, 1889 | 221,124 70 |
| From December 1, 1889, to December 1, 1890 | 231,116 32 |
| From December 1, 1890, to December 1, 1891 | 227,054 53 |
| From December 1, 1891, to December 1, 1892 | 237,327 08 |
| From December 1, 1892, to December 1, 1893 | 242,219 78 |
| From December 1, 1893, to December 1, 1894 | 250,032 71 |
| From December 1, 1894, to December 1, 1895 | 268,813 62 |
| From December 1, 1895, to December 1, 1896 | 281,030 00 |
| From December 1, 1896, to December 1, 1897 | 291,457 63 |
| From December 1, 1897, to December 1, 1898 | 297,129 78 |
| From December 1, 1898, to December 1, 1899 | 302,569 00 |
| From December 1, 1899, to December 1, 1900 | 319,479 37 |
| From December 1, 1900, to December 1, 1901 | 320,468 01 |
| From December 1, 1901, to December 1, 1902 | 323,500 53 |

COMPARATIVE STATEMENT.

| | 1901. | | 1902. | |
|---|--------------|--------------|--------------|--------------|
| CONSTRUCTION ACCOUNT.
(HORRS BROOK RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From bonds issued..... | | | | \$6,000 00 |
| <i>Expended.</i> | | | | |
| Construction of reservoir, land
settlements, etc..... | | | \$5,447 60 | |
| Services of City Solicitor..... | | | 500 00 | |
| Balance to credit of Construction
Account..... | | | 52 40 | |
| | | | | \$6,000 00 |
| CONSTRUCTION ACCOUNT.
(GENERAL.) | | | | |
| <i>Received.</i> | | | | |
| Balance from 1901..... | | | \$13,998 20 | |
| From bonds issued..... | \$30,000 00 | | 2,500 00 | |
| From premium on bonds... .. | 1,530 00 | | 724 65 | |
| From balance of 1900.. .. | 14,575 52 | | | |
| From sale of old material, etc.... | 91 39 | | 749 50 | |
| | | \$46,196 91 | | \$17,972 35 |
| <i>Expended.</i> | | | | |
| Sundry bills and pay rolls..... | \$32,196 71 | | \$16,999 14 | |
| Balance to credit of Construction
Account..... | 13,998 20 | | 973 21 | |
| | | \$46,196 91 | | \$17,972 35 |
| MAINTENANCE ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From "rates, fines, etc."..... | \$321,410 01 | | \$331,249 66 | |
| From sale of shrubs, grass, etc... | 2,561 38 | | 1,583 30 | |
| Supply and repair account..... | 5,253 08 | | 3,849 15 | |
| | | \$329,224 47 | | \$336,682 11 |
| <i>Expended.</i> | | | | |
| Care and repairs..... | | | \$62,298 87 | |
| For work at Fresh Pond..... | | | 9,896 85 | |
| Interest on water debt | \$127,109 00 | | 129,579 00 | |
| Sinking fund requirements..... | 119,703 75 | | 120,828 75 | |
| Rent of offices..... | | | 1,200 00 | |
| Care and repair, pipes and fittings | 79,239 18 | | | |
| Ice for drinking fountains..... | 447 11 | | 461 47 | |
| Abatements | 76 88 | | 3,965 63 | |
| Refunds..... | | | 3,000 00 | |
| Interest of 1902 unpaid and reap-
propriated for 1903..... | | | 3,160 00 | |
| Excess of receipts..... | 2,649 05 | | 2,171 54 | |
| | | \$329,224 47 | | \$336,682 11 |
| Maintenance Account, excess of
receipts | | \$2,649 05 | | \$2,171 54 |

The excess of receipts shown above, amounting to \$2,171.54, has been carried to the sinking fund as required by law.

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 17,488 families, 600 stables, 1,839 horses, 98 cows, 166 shops, and 344 offices and stores, by the following fixtures, viz: —

| | |
|---------------------|---------------------|
| 20,474 faucets, | 34 urinals, |
| 7,475 wash basins, | 8 yard hydrants, |
| 10,687 wash tubs, | 2 fountains, |
| 7,001 bath tubs, | 14 tumbler washers, |
| 200 slop closets, | 1,753 hand hose, |
| 17,837 pan closets, | 6 motors. |
| 3 hopper closets, | |

Also,

978 fire hydrants (beside 19 on private premises).
 8 fire reservoirs.
 28 drinking fountains in public squares.
 59 street watering standpipes.
 4 public sanitaries.

The above schedule of fixtures does not include those in school-houses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made with very satisfactory results.

Respectfully submitted,

WALTER H. HARDING,
Registrar.

ANNUAL STATEMENT OF THE WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DECEMBER 1, 1902.

| | | |
|---|----------|------------|
| Water rates unpaid November 30, 1901 | \$428 34 | |
| Supplies and repairs unpaid November 30, 1901 | 1,004 81 | |
| Food and coal bills unpaid November 30, 1901 | 118 00 | |
| Gas bills unpaid November 30, 1901 | 6 00 | |
| Household bills unpaid November 30, 1901 | 293 91 | |
| | <hr/> | \$1,950 06 |

has been paid in the hands of the City
Treasurer for collection from Decem-
ber 1, 1901, to December 1, 1902

| | | |
|----------------------|--------------|--------------|
| Water rates | \$332,345 99 | |
| Food and coal | 204 00 | |
| Gas | 111 25 | |
| House | 100 00 | |
| Supplies and repairs | 6 148 42 | |
| Household bills | 1,643 97 | |
| Construction bills | 877 13 | |
| | <hr/> | \$339,726 66 |
| Total bills | | <hr/> |
| | | \$341,726 62 |

have also been collected

| | | |
|---------------------------|--------------|--------------|
| Water rates | \$236,100 13 | |
| Food and coal | 400 00 | |
| House | 160 00 | |
| Gas | 107 50 | |
| Household bills | 1,243 20 | |
| Construction bills | 749 20 | |
| Supplies and repair bills | 2,449 13 | |
| | <hr/> | \$239,448 16 |
| Total collections | | |

have also been stated

| | |
|--|------------|
| Water rates, food and coal, and scales sup-
plies and repairs, and Construction
expenses | \$2,206 00 |
|--|------------|

STATEMENT OF THE WATER REGISTRAR.

There remains uncollected:—

| | | |
|--------------------------------------|------------|-------------------------|
| Water rates | \$2,847 12 | |
| Supplies and repairs | 1,281 38 | |
| Off and on | 126 00 | |
| Seals | 9 25 | |
| Maintenance account | 465 88 | |
| Construction account | 77 68 | |
| | <hr/> | \$4,307 21 \$341,738 82 |
| Total bills for collection | | \$341,738 82 |
| Less abated | \$3,985 68 | |
| Less refunded | 3,000 00 | |
| Less unpaid | 4,307 21 | |
| | <hr/> | \$11,292 84 |
| Net receipts | | \$330,445 98 |

Attest:

WALTER H. HARDING,
Registrar.

CAMBRIDGE, December 1902.

I have examined the accounts of the Water Registrar and find that they correspond in the amounts collected, abated, refunded and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor.

STILLMAN F. KELLEY,
Committee on Accounts.

CITY OF CAMBRIDGE,
OFFICE OF CITY TREASURER,

December 1, 1902.

P. to Cambridge Water Board

SIR: I give you herewith a record of the transactions between the Water Office and the City Treasurer's Office during the year ending November 30, 1902.

| | |
|--|--------------|
| Amount collected for account of Water Works, "Water Rates," | |
| "Maintenance" and "Supply" Accounts | \$134,882 11 |
| Amount collected for account of Water Works "Construction" | 1,676 15 |
| "Maintenance" certificates received and paid on "Water Rates" | 2,905 03 |
| "Supply" certificates have been presented, and paid to amount of | 2,000 00 |
| Unpaid bills in my hands Nov 30, 1902, for account of "Water | |
| Works "Maintenance" and "Supply" Accounts | 6,239 88 |
| Unpaid bills Nov 30, 1902, for account of "Construction" | 77 03 |

Very respectfully,

W. W. DALLINGER,
City Treasurer.

I have examined the above statement and find it correct

HARRY T. UPHAM,
City Auditor.

REPORT OF THE SUPERINTENDENT OF WATER WORKS

CAMBRIDGE, December 4, 1902.

To the Honorable Water Board of the City of Cambridge:—

GENTLEMEN:—Complying with the City Ordinance, I herewith submit the twenty-eighth annual report of the Superintendent, for the year ending November 30, 1902.

| | Gallons. |
|--|---------------|
| Total water pumped | 2,980,553,545 |
| Quantity of water sold by meter | 940,768,200 |
| Quantity of water used for sprinkling streets | 80,907,175 |
| Quantity of water used for flushing sewers | 6,250,000 |
| Quantity of water used for cleaning sanitaries | 7,500,000 |
| Quantity of water used for public buildings | 39,804,500 |
| Quantity of water used for drinking fountains | 85,000,000 |
| Quantity of water used for testing meters | 57,500 |
| | 1,110,287,375 |

Number of gallons daily for each inhabitant on the total amount pumped, 85.27.

Number of gallons daily for each inhabitant on total amount used by domestic meters, and including water used for fire purposes, for flushing pipes, blowing off dead ends, puddling trenches and water used for hose and private stables, 54.24.

COMPARATIVE STATEMENT OF TOTAL PUMPING DURING THE PAST TEN YEARS.

| Date. | Total Yearly Pumping. | Increase or Decrease. | Average Daily Pumping. | Increase or Decrease | Gallons to each inhabitant daily. |
|-------|-----------------------|-----------------------|------------------------|----------------------|-----------------------------------|
| 1893 | 273,501,154 | Increase | 6,122,915 | 764,000 | Increase 74.59 |
| 1894 | 106,985,297 | decrease | 5,829,304 | 283,111 | decrease 69.19 |
| 1895 | 62,903,265 | Increase | 6,001,143 | 173,338 | Increase 71.05 |
| 1896 | 222,724,865 | " | 6,594,280 | 592,133 | " 75.99 |
| 1897 | 27,833,638 | " | 6,689,603 | 94,323 | " 78.46 |
| 1898 | 350,980,914 | " | 7,656,196 | 961,593 | " 85.49 |
| 1899 | 90,249,320 | " | 7,397,453 | 247,252 | " 87.16 |
| 1900 | 231,293,180 | decrease | 7,263,773 | 633,630 | decrease 78.69 |
| 1901 | 133,879,300 | Increase | 7,630,566 | 806,796 | Increase 80.67 |
| 1902 | 145,397,106 | " | 8,028,914 | 396,348 | " 86.27 |

STATEMENT OF DOMESTIC FINANCIAL DURING THE LAST
TEN YEARS

| Year | Number of
Pumps | Increase or Decrease
from 1914 | Average
Daily
Pumping | Increase or Decrease
from 1914 | Cost of
Water per
Gallon |
|------|--------------------|-----------------------------------|-----------------------------|-----------------------------------|--------------------------------|
| 1915 | 100 | 100 | 100 | 100 | 100 |
| 1916 | 100 | 100 | 100 | 100 | 100 |
| 1917 | 100 | 100 | 100 | 100 | 100 |
| 1918 | 100 | 100 | 100 | 100 | 100 |
| 1919 | 100 | 100 | 100 | 100 | 100 |
| 1920 | 100 | 100 | 100 | 100 | 100 |
| 1921 | 100 | 100 | 100 | 100 | 100 |
| 1922 | 100 | 100 | 100 | 100 | 100 |
| 1923 | 100 | 100 | 100 | 100 | 100 |
| 1924 | 100 | 100 | 100 | 100 | 100 |
| 1925 | 100 | 100 | 100 | 100 | 100 |
| 1926 | 100 | 100 | 100 | 100 | 100 |
| 1927 | 100 | 100 | 100 | 100 | 100 |
| 1928 | 100 | 100 | 100 | 100 | 100 |
| 1929 | 100 | 100 | 100 | 100 | 100 |
| 1930 | 100 | 100 | 100 | 100 | 100 |
| 1931 | 100 | 100 | 100 | 100 | 100 |
| 1932 | 100 | 100 | 100 | 100 | 100 |
| 1933 | 100 | 100 | 100 | 100 | 100 |
| 1934 | 100 | 100 | 100 | 100 | 100 |
| 1935 | 100 | 100 | 100 | 100 | 100 |
| 1936 | 100 | 100 | 100 | 100 | 100 |
| 1937 | 100 | 100 | 100 | 100 | 100 |
| 1938 | 100 | 100 | 100 | 100 | 100 |
| 1939 | 100 | 100 | 100 | 100 | 100 |
| 1940 | 100 | 100 | 100 | 100 | 100 |
| 1941 | 100 | 100 | 100 | 100 | 100 |
| 1942 | 100 | 100 | 100 | 100 | 100 |
| 1943 | 100 | 100 | 100 | 100 | 100 |
| 1944 | 100 | 100 | 100 | 100 | 100 |
| 1945 | 100 | 100 | 100 | 100 | 100 |
| 1946 | 100 | 100 | 100 | 100 | 100 |
| 1947 | 100 | 100 | 100 | 100 | 100 |
| 1948 | 100 | 100 | 100 | 100 | 100 |
| 1949 | 100 | 100 | 100 | 100 | 100 |
| 1950 | 100 | 100 | 100 | 100 | 100 |
| 1951 | 100 | 100 | 100 | 100 | 100 |
| 1952 | 100 | 100 | 100 | 100 | 100 |
| 1953 | 100 | 100 | 100 | 100 | 100 |
| 1954 | 100 | 100 | 100 | 100 | 100 |
| 1955 | 100 | 100 | 100 | 100 | 100 |
| 1956 | 100 | 100 | 100 | 100 | 100 |
| 1957 | 100 | 100 | 100 | 100 | 100 |
| 1958 | 100 | 100 | 100 | 100 | 100 |
| 1959 | 100 | 100 | 100 | 100 | 100 |
| 1960 | 100 | 100 | 100 | 100 | 100 |
| 1961 | 100 | 100 | 100 | 100 | 100 |
| 1962 | 100 | 100 | 100 | 100 | 100 |
| 1963 | 100 | 100 | 100 | 100 | 100 |
| 1964 | 100 | 100 | 100 | 100 | 100 |
| 1965 | 100 | 100 | 100 | 100 | 100 |
| 1966 | 100 | 100 | 100 | 100 | 100 |
| 1967 | 100 | 100 | 100 | 100 | 100 |
| 1968 | 100 | 100 | 100 | 100 | 100 |
| 1969 | 100 | 100 | 100 | 100 | 100 |
| 1970 | 100 | 100 | 100 | 100 | 100 |
| 1971 | 100 | 100 | 100 | 100 | 100 |
| 1972 | 100 | 100 | 100 | 100 | 100 |
| 1973 | 100 | 100 | 100 | 100 | 100 |
| 1974 | 100 | 100 | 100 | 100 | 100 |
| 1975 | 100 | 100 | 100 | 100 | 100 |
| 1976 | 100 | 100 | 100 | 100 | 100 |
| 1977 | 100 | 100 | 100 | 100 | 100 |
| 1978 | 100 | 100 | 100 | 100 | 100 |
| 1979 | 100 | 100 | 100 | 100 | 100 |
| 1980 | 100 | 100 | 100 | 100 | 100 |
| 1981 | 100 | 100 | 100 | 100 | 100 |
| 1982 | 100 | 100 | 100 | 100 | 100 |
| 1983 | 100 | 100 | 100 | 100 | 100 |
| 1984 | 100 | 100 | 100 | 100 | 100 |
| 1985 | 100 | 100 | 100 | 100 | 100 |
| 1986 | 100 | 100 | 100 | 100 | 100 |
| 1987 | 100 | 100 | 100 | 100 | 100 |
| 1988 | 100 | 100 | 100 | 100 | 100 |
| 1989 | 100 | 100 | 100 | 100 | 100 |
| 1990 | 100 | 100 | 100 | 100 | 100 |
| 1991 | 100 | 100 | 100 | 100 | 100 |
| 1992 | 100 | 100 | 100 | 100 | 100 |
| 1993 | 100 | 100 | 100 | 100 | 100 |
| 1994 | 100 | 100 | 100 | 100 | 100 |
| 1995 | 100 | 100 | 100 | 100 | 100 |
| 1996 | 100 | 100 | 100 | 100 | 100 |
| 1997 | 100 | 100 | 100 | 100 | 100 |
| 1998 | 100 | 100 | 100 | 100 | 100 |
| 1999 | 100 | 100 | 100 | 100 | 100 |
| 2000 | 100 | 100 | 100 | 100 | 100 |
| 2001 | 100 | 100 | 100 | 100 | 100 |
| 2002 | 100 | 100 | 100 | 100 | 100 |
| 2003 | 100 | 100 | 100 | 100 | 100 |
| 2004 | 100 | 100 | 100 | 100 | 100 |
| 2005 | 100 | 100 | 100 | 100 | 100 |
| 2006 | 100 | 100 | 100 | 100 | 100 |
| 2007 | 100 | 100 | 100 | 100 | 100 |
| 2008 | 100 | 100 | 100 | 100 | 100 |
| 2009 | 100 | 100 | 100 | 100 | 100 |
| 2010 | 100 | 100 | 100 | 100 | 100 |
| 2011 | 100 | 100 | 100 | 100 | 100 |
| 2012 | 100 | 100 | 100 | 100 | 100 |
| 2013 | 100 | 100 | 100 | 100 | 100 |
| 2014 | 100 | 100 | 100 | 100 | 100 |

[illegible]

- 20 -

[illegible]

FRESH POND AND SURROUNDINGS.

The condition of the grounds, roads and walks about the Pond has been maintained as in past years; the care and propagation of plants and shrubs in the nursery has been continued.

The sale of plants this season has amounted to \$533.41; in addition to these a great quantity of shrubs, etc., has been used on the sections graded this year.

The appropriation of \$10,000.00 made for the park work about the Pond has been expended in continuing the grading on the the north and northwest sides of Concord and Huron Avenues. Work was begun September 2nd and continued until November 15th. This portion of the border of the Pond is now nearly completed, and with a few years' growth of the shrubbery it will form a very attractive section of the park system.

As in past years all standing grass not needed by the department has been sold.

The average height of the Pond has been 15.17 or .52 lower than last year; but in comparing these elevations the fact should be taken into consideration that the rainfall this year has been 2.89 less than that of last year.

A catch basin has been built on Huron Avenue near Concord Avenue.

FRESH POND RESERVOIR.

| Date | No. of
Engines
Running | No. of
Engines
Stopped | No. of
Engines
Broken | INTAKE GATE | | | |
|-------------|------------------------------|------------------------------|-----------------------------|---------------------------------|--------|-------------------------------|--------|
| | | | | North Opening | | South Opening | |
| | | | | Opened | Closed | Opened | Closed |
| January 1 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 2 | 2 | 13 | 0 | | | | |
| January 3 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 4 | 2 | 13 | 0 | | | | |
| January 5 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 6 | 2 | 13 | 0 | | | | |
| January 7 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 8 | 2 | 13 | 0 | | | | |
| January 9 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 10 | 2 | 13 | 0 | | | | |
| January 11 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 12 | 2 | 13 | 0 | | | | |
| January 13 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 14 | 2 | 13 | 0 | | | | |
| January 15 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 16 | 2 | 13 | 0 | | | | |
| January 17 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 18 | 2 | 13 | 0 | | | | |
| January 19 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 20 | 2 | 13 | 0 | | | | |
| January 21 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 22 | 2 | 13 | 0 | | | | |
| January 23 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 24 | 2 | 13 | 0 | | | | |
| January 25 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 26 | 2 | 13 | 0 | | | | |
| January 27 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 28 | 2 | 13 | 0 | | | | |
| January 29 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| January 30 | 2 | 13 | 0 | | | | |
| February 1 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 2 | 2 | 13 | 0 | | | | |
| February 3 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 4 | 2 | 13 | 0 | | | | |
| February 5 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 6 | 2 | 13 | 0 | | | | |
| February 7 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 8 | 2 | 13 | 0 | | | | |
| February 9 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 10 | 2 | 13 | 0 | | | | |
| February 11 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 12 | 2 | 13 | 0 | | | | |
| February 13 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 14 | 2 | 13 | 0 | | | | |
| February 15 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 16 | 2 | 13 | 0 | | | | |
| February 17 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 18 | 2 | 13 | 0 | | | | |
| February 19 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 20 | 2 | 13 | 0 | | | | |
| February 21 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 22 | 2 | 13 | 0 | | | | |
| February 23 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 24 | 2 | 13 | 0 | | | | |
| February 25 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 26 | 2 | 13 | 0 | | | | |
| February 27 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 28 | 2 | 13 | 0 | | | | |
| February 29 | 1 | 14 | 0 | Starting entire month, 20 turns | | Starting entire month, 20 in. | |
| February 30 | 2 | 13 | 0 | | | | |

PUMPING STATION AND GROUNDS

The engines and boilers are reported by the Chief Engineer to be in first-class condition, the new Engine No. 7 having done substantially as well as the last year.

The grounds about the station have received the usual care and attention.

The repairs of the pumping station should be finished the coming year and the conductors and gutters should be repaired.

PAYSON PARK RESERVOIR.

The south basin of the reservoir was cleaned out the early part of the season and the fence has been scraped and painted.

The grounds and buildings are in good condition.

No material change has occurred in the leakage from these basins.

PIPE YARD.

The woodwork of the shop and stable has been painted and a new fence has been built in front and alongside of the dwelling house.

The fence along Auburn Street has been repaired.

The dwelling house and sheds should be painted the coming year.

HIGH SERVICE.

Following is the list of streets supplied from the high service : —

Agassiz Street.

Appleton Street, from Highland Street
to beyond Hutchinson Street.

Arlington Street.

Avon Hill Street.

Bates Street.

Bellevue Avenue.

Bellevue Avenue, west.

Buena Vista Park.

Concord Avenue, from Huron Avenue
to Buckingham Street.

Garden Street, from Huron Avenue to
Linnaean Street.

Highland Street, from Reservoir Street
to Appleton Street.

Hillside Avenue.

Holly Avenue.

Humboldt Street.

Huron Avenue, from Appleton Street
to Raymond Street.

Lancaster Street.

Linnaean Street.

Mount Pleasant Street.

Raymond Street, from Linnaean Street
to Walden Street.

Reservoir Street, from Highland Street.

Upland Road, from Richdale Avenue to
Huron Avenue.

Vassal Lane, from Huron Avenue.

Vincent Street.

Walnut Avenue.

Washington Avenue.

LIST OF CHECK VALVES IN USE.

Appleton Street at Hutchinson Street.

Avon Hill Street and Linnaean Street.

Concord Avenue at Buckingham Street.

Garden Street and Linnaean Street.

Raymond Street and Linnaean Street.

Upland Road near Mt. Vernon Street.

Vincent Street at Walden Street.

LEAKAGE.

Twenty three hundred thirty-nine (2,339) leaks have been reported and repaired this year. they were discovered as follows.

Eighty six (86) on supplies in street.
 One (1) on forty inch check valve at Pumping Station
 One (1) on thirty inch Mumy Brook main in Holworthy Street.
 One (1) on twenty-four inch main (pumping main) Lake View Avenue.
 One (1) on twenty inch main in Craigie Square.
 One (1) on two inch main
 Ten (10) on six inch mains
 Five (5) on four inch mains
 One (1) on siphon in Third Street.
 Five (5) on hydrants
 Two (2) on hydrant supplies
 Two (2) on fountains
 Five (5) on street watering standpipes
 One (1) on fire supply
 Five (5) on gates
 Twenty two hundred two (2,202) on premises

Of the foregoing leaks on premises twenty one hundred ninety-five (2,195) have been reported by our inspectors. they were discovered by them either on the annual canvass and reported as follows

Eighteen hundred ninety-five (1,695) on water closets
 Five hundred thirty nine (539) on faucets
 Twenty six (26) on pipes
 Three (3) on all corks
 Ten (10) on stop and wastes
 Twenty (20) on tanks.

Thirteen (13) leaks on supplies in street have been caused by electro-pneumatics on the pipe. the cost of repairs has as usual been charged to the Boston Elevated Railway Company

TABLE SHOWING A GAIN OR LOSS IN THE TOTAL CONSUMPTION
FOR THE YEAR 1902 OVER THE YEAR 1901.

| | Total Consump-
tion 1901. | Total Consump-
tion 1902. | Increase or
Decrease, + or —. |
|----------------|------------------------------|------------------------------|----------------------------------|
| December | 220,410,520 | 255,777,480 | 35,366,960+ |
| January..... | 239,847,080 | 269,285,480 | 29,418,400+ |
| February | 235,592,720 | 236,038,880 | 446,160— |
| March..... | 222,808,960 | 231,112,200 | 8,303,240+ |
| April..... | 208,326,800 | 222,982,065 | 14,605,265+ |
| May | 207,740,720 | 240,481,400 | 32,690,680+ |
| June | 236,636,840 | 273,874,920 | 37,238,080+ |
| July | 255,524,280 | 256,684,120 | 1,159,840+ |
| August..... | 246,125,000 | 242,271,280 | 3,853,640— |
| September..... | 231,464,200 | 232,555,840 | 1,091,640+ |
| October | 250,991,840 | 244,691,040 | 6,300,800— |
| November..... | 229,687,480 | 224,918,760 | 4,768,720— |
| Total | 2,785,156,440 | 2,990,553,545 | 145,397,105+ |

MAIN PIPE.

Ten thousand three hundred thirty-one and one-half (10,331½) feet of cast iron main pipe have been laid during the year; of this amount four thousand three hundred ninety (4,390) feet were used on extension in new locations and five thousand nine hundred forty-one and one-half (5,941½) feet were used in renewing pipe that had been in use for years and inadequately supplied the vicinity wherein located. The sizes were from four-inch to twelve-inch.

In Burns Court from Bradbury Street to Foster Street a new four-inch main has been laid to replace the old three-inch laid in 1868.

The construction of the sewer in Cambridge Street from Inman Square to Baldwin Street made it necessary to lay a new pipe to take the place of the old ten-inch pipe, laid in 1867, located on the north side of the street. Two thousand twenty-three (2,023) feet of twelve-inch and one hundred sixty-one (161) feet of ten-inch pipe were laid and connected to the twenty-four inch on the south side of Cambridge Street and also to all the cross streets. The location given for this pipe was the same as that occupied by the old twenty-inch cement pipe which it became necessary to remove before laying the new pipe. This made the expense of laying more than usual, but the old iron from the cement pipe was sold for \$291.58 on the street. The total cost of pipe, gates and connections, and the laying of same, was \$6,194.23.

specified; this was done in addition to the foregoing general inspection made by the Assistant Superintendent.

Two (2) new blow-off cocks have been placed in Saint Paul Street.

On March 8th a schooner while coming through the draw at Third Street bridge grounded and as the tide went out settled on the twelve-inch pipe and broke it. The water has been shut off on each side since that date and I would recommend that the siphon at Brookline Street bridge, which is not in use, be moved to Third Street. This would give us at that point a perfectly safe siphon under all possible conditions of traffic.

MAIN PIPE LAID, NUMBERS OF GATES AND FIRE HYDRANTS.

| | IRON PIPE. | | GATES. | HYDRANTS. |
|--|------------|-------|--------|-----------|
| | Feet. | Size. | Size. | Kind. |
| | | inch. | inch. | |
| Allston street, at Sidney street, east.... | | | 6 | |
| " " " " west..... | | | 6 | |
| " " " " "..... | 4 | 6 | | Chapman. |
| Appleton street, opposite Brewster street..... | 7 | 6 | | Chapman. |
| " " " " "..... | 2 | 10 | | |
| Baldwin street, connection at Cambridge street..... | 14 | 6 | | |
| " " corner Emmons place.. | | | | Flush. |
| Banks street, corner Flagg street..... | | | | Chapman. |
| Brattle street, between Channing and Lowell streets.. | 7 | 6 | | Chapman. |
| " " at Story street..... | | | | Chapman. |
| Brewster street, near Riedesel avenue..... | 4 | 6 | | Chapman. |
| Burns court, from Bradbury to Foster streets..... | 233 | 4 | | |
| " " at Bradbury street..... | | | 4 | |
| Cambridge street, at Baldwin street, north..... | | | 10 | |
| " st., from beyond Baldwin to Ellery street.... | 161 | 10 | | |
| " st., at Fayette st. (cross connection)..... | 16 | 6 | | |
| " street, opposite Fayette street..... | | | | Chapman. |
| " st., from Inman square to Ellery street..... | 2,023½ | 12 | | |
| " street, at Leonard avenue, north..... | | | 12 | |
| " " " " " on hydrant..... | 18 | 6 | | |
| " st., at Maple avenue(cross connection)..... | 20 | 6 | | |
| " " " " " north..... | | | 12 | |
| " " between Maple and Highland avenues... | 7 | 6 | | Chapman. |
| Camella avenue, connection at Cambridge street..... | 14 | 6 | | |
| Charles street, from Sixth street.... | 96 | 6 | | |
| Chestnut street, extension toward Waverly street. | 54 | 4 | | |
| Cogswell place, from Mead st. to Cogswell ave..... | 526 | 6 | | |
| " avenue, at Mead street..... | | | 6 | |
| Columbia street, at Harvard street..... | 7 | 6 | | Chapman. |
| Cottage Park avenue..... | 84 | 4 | | |
| East street from North street to Leighton court..... | 209 | 6 | | |
| Ellsworth avenue at Cambridge street..... | 53 | 6 | | |
| Eric street, at Bell street..... | | | 6 | |
| " " from Bell to Sidney streets..... | 390 | 6 | | |
| " " at corner Brookline street..... | | | | Flush. |
| " " at Sidney street. | | | 6 | |
| Fayerweather street, toward Vassal lane..... | 258 | 8 | | |
| First street, corner Bent street..... | 31n. | 12 | | Chapman. |
| " " " " "..... | 9 | 6 | | |
| " " " Rogers street.. | 3 | 12 | | Chapman. |
| " " " " "..... | 9 | 6 | | |
| Forest street, at Garfield street..... | | | 4 | |
| Francis avenue, extension to Everett street..... | 333½ | 4 | | |
| " " at Everett street..... | | | 4 | |
| Harris street, at Oxford street..... | 50 | 6 | | |
| " " " " "..... | | | 6 | |

9. 1. 28. 11. NUMBER OF LATS AND FIRE INCIDENTS - continued

[illegible]

The sizes, lengths and weights of cast iron pipe laid are as follows :—

| Size. | Length in Feet. | Weight in Tons. |
|---------|-----------------|-----------------|
| 12-inch | 2,483½ | 110.44 |
| 10-inch | 163 | 5.75 |
| 8-inch | 1,789 | 38.34 |
| 6-inch | 4,381½ | 62.59 |
| 4-inch | 1,154½ | 9.79 |

SUPPLIES.

There have been one hundred sixty-one (161) supplies laid this year in new locations, making the total number laid to date, fourteen thousand five hundred and sixty-nine (14,569).

The account of the number and sizes of new supplies will be found in recapitulation table on page 42.

Four-inch supplies have been laid for Charles Wetmore on Bow Street and for Harvard College, Pierce Hall, on Oxford Street; and the Boston & Maine Railroad has required two large supplies; one of four-inch pipe in Sherman Street and one of six-inch pipe in East Street.

In addition to the foregoing large supplies we have laid eight (8) fire supplies as follows: A four-inch for George F. Blake Manf'g Co. on Binney Street; a six-inch for Cambridge Electric Light Company on Western Avenue; a six-inch for the Cambridge Observatory, Harvard College; a six-inch for Little, Brown & Co. on Putnam Avenue; a six-inch for the National Biscuit Company on Franklin Street; two two-inch for P. G. Rice & Co. on Massachusetts Avenue and Lee Street; and one four-inch for University Associates on Massachusetts Avenue. Nine (9) supplies have been laid at the request and for the Sewer Department while constructing its sewers in several streets; as these were temporary supplies and have been removed, they were not included in the foregoing number.

Fifty-one (51) supplies have been furnished with sidewalk shut off boxes.

One hundred sixty-seven (167) supplies have been renewed as follows:

As the main pipes were renewed in the following named streets the supplies were renewed where necessary; five (5) in Burns Court; one (1) in Cambridge Street; seven (7) in Cogswell Place; five (5) in East

| | | |
|--------------------------------------|-------------------------------|---------------|
| Ginn & Co., | First street, | Two 6-in. |
| " " | Athenaeum street, | 8-in. |
| Goepper Brothers, | Ninth street, | 1 1-2-in. |
| Harvard College, | Harvard Union, Harvard st., | 4-in. |
| " " | Memorial Hall, Cambridge st., | 4-in. |
| " " | Observatory, Concord avenue, | 6-in. |
| " " | Semitic Mus'm, Divinity ave., | 4-in. |
| Holy Ghost Hospital for Incurables, | Hovey avenue, | 3-in. |
| Houghton, Mifflin & Co., | Albro & Blackstone streets, | 6-in. |
| " " " | River street, | 6-in. |
| Irving & Casson, | Otis street, | 6-in. |
| " " | Thorndike street, | 6-in. |
| " " | Thorndike street, | 2-in. |
| Ivers & Pond Piano Co., | Albany street, | 4-in. |
| Jones & Co., C. L., | Pearl street, | 4-in. |
| Keeler & Co., | Thorndike street, | 1-in. |
| Kendall, Edward, & Sons, | Main street, | 2-in. |
| Lamb & Ritchie, | Albany street, | 6-in. |
| Lever Bros. Limited (Boston Works), | Broadway, | 6-in. |
| Little, Brown & Co., | Putnam avenue, | 6-in. |
| Lockhart, Wm. L., & Co., | Bridge street, | 1 1-2-in. |
| Luke, E. H., Estate of, | Main street, | 2-in. |
| Mason & Hamlin Co., | Broadway, | Two 6-in. |
| Massachusetts Athletic Ass'n, | Lansdowne street, | 4-in. |
| Metropolitan Storage Warehouse Co., | Massachusetts avenue, | 6-in. |
| Middlesex C'ty, House of Correction, | Second & Spring streets, | 6-in. |
| National Biscuit Co., | Franklin street, | 4-in. |
| " " " | Franklin street, | 6-in. |
| " " " | Green street, | 8-in. |
| National Linseed Oil Co., | Fifth street, | 6-in. |
| North Packing & Provision Co., | Winsor street, | 6-in. |
| O'Brien, John (Rev.), | Seventh street, | 4-in. |
| Page, Geo. G., Box Co., | Hampshire street, | 6-in. & 4-in. |
| Petterson, Oscar G., | 483 Main street, | 4-in. |
| Pierce, Thomas, Trustees of Est., | Broadway, | 6-in. & 4-in. |
| Pi Eta Club, | Winthrop street, | 2-in. |
| Porter, Henry S., | Kinnaird street, | 4-in. |
| Reardon, John, & Sons, Corporation, | Waverly street, | 4-in. |
| Reardon, William, | Portland street, | 2-in. |
| Revere Sugar Refinery, | Water street, | 6-in. |
| Reversible Collar Co., | Putnam avenue, | 6-in. |
| Russell, Lucy J., | 29 Elm street, | 1 1-2-in. |
| Rice, P. G., & Co., | Massachusetts ave. & Lee st., | Two 2-in. |
| Sawyer, Howard M., & Son, | Thorndike street, | 4-in. |
| Seavey Manufacturing Co., | Third street, | 6-in. |
| Seelye Manufacturing Co., | First street, | 4-in. |
| Simplex Electrical Co., | Auburn street, | 3-in. |
| " " " | Auburn street, | 6-in. |
| " " " | Franklin street, | 6-in. |
| Slavens, Luther R., | Broadway, | 2-in. |
| Sparrow, H. F., & Co., | Hampshire street, | 6-in. |
| Speare's, Alden, Sons & Co., | Rogers street, | 4-in. |
| " " " " | Sixth street, | 4-in. |
| Standard Oil Co., | Potter street, | 6-in. |
| Standard Turning Works, | Main street, | 2-in. |
| Thayer, Henry, & Co., | Broadway, | 6-in. |

| | | |
|----------------------------|--------------------------------|-------|
| Water by meter, A. Co., | Broadway, | 4 in. |
| Manufacturing Association, | London street, | 4 in. |
| | Massachusetts avenue, | 6 in. |
| Manufacturing Firm, | Notting place, | 6 in. |
| Warner & Co., | Claverly Hall, Mt. Auburn st., | 4 in. |
| Water works Brothers, | Albany street, | 4 in. |

DRINKING FOUNTAINS

There has been no addition this year to the number of drinking fountains there are twenty-eight (28) in use, of which four (4) are ice water drinking fountains.

The ice-water drinking fountains were supplied with ice from June 1 to September 30, inclusive, at a cost of four hundred sixty-one and 40/100 dollars (\$461 40/100), as follows: Central Square fountain, \$119 70/100; Lake Cambridge fountain, \$131 00/100; Harvard Square fountain, \$20 15/100; North Cambridge fountain \$90 62/100. An appropriation of five hundred dollars (\$500 00/100) was made by the City Council for this expenditure.

The fountains have been inspected and repaired as usual. Following are some of those which have received more extended repairs: Brattle Street, Cambridge Field, Central Square, Inman Square, Kendall Square, North Square, Rindge Field, Sherman Square.

STREET WATERING STANDPIPES

As of date December 1, 1902 there are sixty-one (61) street watering standpipes in use.

There have been added to the list this year as follows:

1. At the corner of Tremont Street, corner of Trembridge Street, and on Rindge at the corner of Clifton Street, this standpipe was situated previous to this location on Lake View Avenue, but was not included in the list as it was not used for street sprinkling purposes.

The standpipe located at corner of Austin and School Streets has been found to have its final testing place at the corner of Winthrop and State Streets. It has been relocated several times but has always been a source of annoyance to its neighbors.

At the corner of Broadway and South Street a new standpipe has been put in to replace one that was broken.

In the following named streets the standpipes have been repaired: Beacon Square, Beach Street at Massachusetts Avenue, Broad Street at

Garden Street; Central Square; Massachusetts Avenue at Frank Street; Massachusetts Avenue at Hancock Street; Thorndike and Sixth Streets; River Street near Putnam Avenue; Waterhouse and Garden Streets; Winsor Street at Broadway; Winsor Street at Cambridge Street.

The Street Department has as in previous years reimbursed this department for the expense incurred in repairing the standpipes injured by frost.

GATES.

Thirty-nine (39) gates have been set this year. (See lists on page 42).

Fifteen (15) on extension of main pipes.

Fifteen (15) on renewal of main pipe.

Nine (9) on supplies.

The usual thorough examination of gates has been made, and their situation carefully located.

At Cambridge Street, corner of First Street, the gate has been raised.

In Prison Point Street one (1) eight-inch and one (1) one six-inch gates have been set to take the places of old ones. This work was done at the request of the Boston & Maine Railroad Company, and the cost of same has been charged to it.

BOXES.

The total number of boxes set during the year was one hundred eight (108).

Thirty-one (31) iron boxes have been set on extension and renewal work.

Thirty-one (31) special meter boxes have been set with meters.

Twenty-three (23) iron boxes have been set on new supplies.

Twenty-three (23) boxes have been set in place of worthless ones removed as follows: eighteen (18) iron; two (2) wooden; two (2) flush; and one (1) meter boxes.

In ten (10) locations the boxes have been lowered.

In nineteen (19) locations the boxes have been raised.

In seven (7) locations the boxes have been repaired, and

In one (1) location a gate box has been reset.

The grades of hydrants in the following streets have been changed to conform to the surface elevation : Boylston Street opposite Eliot Street ; Bridge Street ; Dana Street between Broadway and Cambridge Street ; Lake View Avenue at No. 107 ; Mount Auburn Street at Channing Street ; Mount Auburn Street at Elmwood Avenue ; Quincy Square ; Sherman Street ; Washington Avenue near Upland Road.

In the locations following the hydrants have been repaired : Bow Street at Plympton Street ; Burleigh Street at Hastings Street ; Cambridge Cemetery ; Cedar Street at Harvey Street ; Columbia Street at Broadway ; Crescent Avenue near Hewes' pottery ; Green Street at Bay Street ; Green Street at Vernon Street ; Hampshire Street at Elm Street ; Harvard Street at Bigelow Street ; Lee Street ; Market Street at Columbia Street ; Mount Auburn Street at Banks Street ; Mount Auburn Street at Boylston Street ; Mount Auburn Street at Lowell Street ; Union Street ; Walker Street ; Washington Avenue.

At Blanche Street, corner of Massachusetts Avenue, the Chapman hydrant has been relocated.

In Prison Point Street the hydrants have been removed and relocated temporarily during the construction of the new street. So soon as this work is completed the hydrants will be set in permanent locations.

In Franklin Street the Chapman hydrant has been relocated at the expense of and for the accommodation of the National Biscuit Company.

The annual inspection of hydrants has been made.

METERS.

Two hundred fifty-four (254) meters have been set this year in new locations, as follows : Three (3) were set on police stations ; thirty-six (36) were set on schoolhouses ; sixteen (16) were set on churches ; eight (8) were set on engine houses in various parts of the City ; the remaining number, one hundred ninety-one (191) were set at the request of the property owners, or where in the judgment of the Water Board they were necessary, in order to prevent waste of water.

The sizes were as follows : One hundred twenty-seven (127) of five-eighths inch ; sixty-seven (67) of three-fourths inch ; forty-five (45) of one inch ; eight (8) of one and one-half inch ; four (4) of two inches ; one (1) of three inches ; one (1) of four inches ; one (1) of six inches.

The number of meters now in use in the City is.

| | |
|----------------|-----------------|
| 3 Bell & Potts | 9 Thompson |
| 61 Crown | 604 Trident |
| 2 Empire | 36 Union Rotary |
| 1 Gem | 1 Weir |
| 140 Hervey | 73 Worthington |
| 44 Lambert | — |
| 11 Nash | 2 113 |

STONY BROOK PIPE LINE.

The annual inspection of all the gates and air valves has been made this last year. The work of examining the line for leaks was continued this year with the result that in that portion of the line through Holworthy Street and Mount Auburn Street as far as Cottage Street in Watertown nearly every joint uncovered was found in a leaky condition.

owing to a change in grade of Pleasant Street in Watertown a portion of the main will have to be lowered the coming season. Work is now in progress in a portion west of Mount Street in Waltham where the pipe was laid in a trench and has settled.

The ejector placed on the summit of the main in Holworthy Street for the purpose of removing the air has been in operation during the whole of the year with, I think, very satisfactory results in the discharge of the air.

STONY BROOK

Two cesspools and one vault have been constructed the past year to improve the drainage on the watershed of this brook, making a total of eighteen cesspools and nineteen vaults.

The cleaning of the same has been done by our outfit, it only being necessary to hire a double team when needed. The practice shows a material saving over previous years.

HOBBS BROOK

The twelve-inch drain which was under construction at the date of the last report has been finished and has removed all standing water from that portion of the filled land near Winter Street.

The condition of the meadows last winter being favorable, about fifteen thousand four hundred fifty (15,450) feet of ditching was done on the land about the upper portion of this basin. The ditches have been cleaned of all obstructions this fall, and are in good condition.

The usual cleaning up along the line of fences has been done, and all grass not needed has been sold standing.

RECAPITULATION.

| | 8
Inch | 6
Inch | 4
Inch | 3
Inch | 2
Inch | 1½
Inch | 1¼
Inch | 1
Inch | ¾
Inch | Total |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|------------|------------|-----------|-----------|--------|
| Length, in feet, of pipe..... | 24 | 183 | 191½ | 4 | 404½ | 126½ | 519½ | 1,477 | 3,905½ | 6,335½ |
| Number of supplies..... | | 5 | 5 | | 12 | 3 | 8 | 28 | 100 | 161 |
| Number of stop and waste valves..... | | | | | 11 | 4 | 6 | 25 | 94 | 140 |
| Number of screw cocks..... | | | | | 12 | 1 | 10 | 26 | 101 | 150 |
| Number of sidewalk cocks..... | | | | | 1 | | 8 | 27 | 105 | 141 |
| Number of service boxes..... | | | | | | | | | | 124 |
| Number of gates..... | | 5 | 3 | 1 | | | | | | 9 |
| Number of gate boxes..... | | | | | | | | | | 23 |

MAIN PIPE.

| | 12
Inch | 10
Inch | 8
Inch | 6
Inch | 4
Inch | Total |
|--|------------|------------|-----------|-----------|-----------|---------|
| Length, in feet, of pipe extension.... | 820 | 2 | 911 | 1,748½ | 908½ | 4,392 |
| Length, in feet, of pipe renewals.... | 2,023½ | 161 | 878 | 2,633 | 246 | 5,941½ |
| Total length, in feet, of pipe..... | 2,843½ | 163 | 1,789 | 4,381½ | 1,154½ | 10,332½ |
| Number of gates..... | 5 | 1 | 1 | 18 | 6 | 31 |
| Number of hydrants.. | | | | 42 | | 42 |

TABLE SHOWING THE DAILY AVERAGE GALLONS, BY THE MONTH, FLOWING OVER THE WASTE WAY AT STONY BROOK.

| | | | Gallons. | Number of Days. | | | | Gallons. | Number of Days. |
|-----------|----------|---------------|----------|-----------------|------------|----------|------------|----------|-----------------|
| December, | 1901.... | 735,900,000 | 23 | | June, | 1902.... | 100,000 | 1 | |
| January, | 1902.... | 905,000,000 | 31 | | July, | 1902.... | | | |
| February, | 1902.... | 494,200,000 | 28 | | August, | 1902... | | | |
| March, | 1902.... | 2,798,700,000 | 31 | | September, | 1902.... | | | |
| April, | 1902.... | 1,257,800,000 | 30 | | October, | 1902.... | 16,700,000 | 3 | |
| May, | 1902.... | 321,700,000 | 31 | | November, | 1902.... | 7,000,000 | 4 | |

Total amount wasted 6,539,100,000 gallons.
Total number of days in which water wasted 182

[illegible]

COMPARATIVE TRENCHING FOR THE PAST TEN YEARS.

| | Extensions. | Renewals. | Supplies. | Total Feet. | Miles. |
|-----------|-------------|-----------|-----------|-------------|--------|
| 1893..... | 18,890½ | 11,008 | 14,233½ | 43,622 | 8.26 |
| 1894..... | 18,673 | 17,481½ | 17,211 | 48,365½ | 9.16 |
| 1895..... | 11,063 | 15,638½ | 22,260 | 48,967½ | 9.27 |
| 1896..... | 17,621 | 26,043 | 17,861 | 61,025 | 11.53 |
| 1897..... | 11,268 | 36,967½ | 16,121½ | 64,357 | 12.19 |
| 1898..... | 11,045½ | 25,397 | 12,186 | 48,628½ | 9.21 |
| 1899..... | 11,051½ | 9,427½ | 13,486½ | 33,965½ | 6.43 |
| 1900..... | 9,174 | 412½ | 6,848 | 16,434½ | 3.11 |
| 1901..... | 4,126 | 5,750 | 8,246 | 18,122 | 3.43 |
| 1902..... | 4,392 | 5,941½ | 6,835½ | 17,169 | 3.25 |

Accompanying this will be found the report of the Chief Engineer of the Pumping Station.

All of which is respectfully submitted,

E. C. BROOKS,
Superintendent.

REPORT OF THE PUMPING ENGINEER

PUMPING STATION, CAMBRIDGE, MASS.,

December 1, 1902

W. LEWIS C. HARRIS, Super.

SIR: I would report the machinery and boilers at the pumping station in first-class condition.

The Lowell Engine No. 7, continues to run very satisfactorily, pumping 90 per cent of all the water used by the City the past year, at very little expense for repairs.

The coal used the last half of the year has been very inferior in quality and has considerably reduced the average duty for the year.

Respectfully submitted,

E. I. HARRIS

OPERATING EXPENSES AT PUMPING STATION.

| | | | | | | | | |
|-------------------------|---|---|---|---|---|---|---|-------------|
| Coal | . | . | . | . | . | . | . | \$7,876.31 |
| Express | . | . | . | . | . | . | . | 8.75 |
| Ice | . | . | . | . | . | . | . | 15.30 |
| Oil, grease and packing | | | | . | . | . | . | 429.30 |
| Repairs on engines | | | . | . | . | . | . | 135.33 |
| Repairs on boilers | | | . | . | . | . | . | 93.40 |
| Repairs on buildings | | | . | . | . | . | . | 127.11 |
| Telephone | . | . | . | . | . | . | . | 75.62 |
| Tools and hardware | | | . | . | . | . | . | 69.88 |
| Miscellaneous | . | . | . | . | . | . | . | 65.28 |
| Salaries | . | . | . | . | . | . | . | 7,303.72 |
| | | | | | | | | \$16,200.00 |

SUMMARY OF STATISTICS

FOR THE YEAR ENDING NOVEMBER 30, 1902.

In form recommended by the New England Water Works Association.

CAMBRIDGE WATER WORKS,

CITY OF CAMBRIDGE, COUNTY OF MIDDLESEX, STATE OF MASSACHUSETTS.

GENERAL STATISTICS.

Population by census 1900 — 91,886.

Date of construction — 1855.

By whom owned — City of Cambridge.

Source of supply — Hobbs and Stony Brooks in Lincoln, Waltham and Weston, and Fresh Pond in Cambridge.

Mode of supply (whether gravity or pumping) — Gravity from Hobbs and Stony Brook to Fresh Pond, pumping from Fresh Pond to Payson Park Reservoirs, thence to consumers by gravity.

PUMPING STATISTICS.

1. Builders of pumping machinery — One Leavitt, built by Groshon High Duty Pumping Engine Company ; two Worthington ; one Blake.

2. Description of fuel used — *a.* Kind — bituminous.

b. Brand of coal — Cumberland.

c. Average price of coal per gross ton, delivered, contract May, 1902, \$4.30 ; contract, October, 1902, \$8.50.

3. Coal consumed for the year — 4,097,200 lbs.

4. (Pounds of wood consumed) $\div 3$ = equivalent amount of coal, 500 lbs.

5. Total equivalent coal consumed for the year = (3) + (4), 4,097,700 lbs.

6. Total pumpage for the year — 2,930,553,545 gallons, without allowance for slip.

- a. Average static head against which pumps work 158.43 feet
- b. Average dynamic head against which pumps work - 194.44 feet
- c. Number of gallons pumped per pound of equivalent coal (5), 715
- d. Total gallons pumped \div Total dynamic head (8) = 113 274,363
- e. Total fuel consumed (3)
- f. Cost of pumping, figured on pumping station expenses, viz., \$16,300
- g. Per million gallons pumped \$5.53
- h. Per million gallons raised one foot (dynamic) --- \$0.28

i. Low duty engines were run 173 hours during year.

FINANCIAL STATISTICS FOR YEAR 1902

RECEIPTS.

| | | |
|-------------------------------|--------------|--------------|
| cash receipts | | \$1,583 30 |
| land sales | \$194,466 70 | |
| motor sales | 132,000 00 | |
| | <hr/> | 326,466 70 |
| land sales | | 19,224 65 |
| engine sales | 3,850 00 | |
| land and on supplies and rent | 763 00 | |
| land material | 749 50 | |
| | <hr/> | 5,362 50 |
| | | <hr/> |
| | | \$352,657 15 |

EXPENDITURES

| | |
|-----------------------------------|--------------|
| operation management and repairs) | \$39,943 64 |
| land | 1,200 00 |
| motor | 461 47 |
| land P and work | 9,926 83 |
| land on to sale | 129,379 00 |
| land land | 120,828 75 |
| land of services | 2,253 23 |
| land of mains | 13,970 34 |
| land of motors | 3,028 80 |
| land P and construction | 3,947 60 |
| | <hr/> |
| | \$347,311 68 |

| | | |
|-------------------------------|-------|--------------------|
| Net cost of works to date | . . . | \$5,724,301 60 |
| Bonded debt at date | . . . | 3,350,600 00 |
| Value of Sinking Fund at date | . . . | |
| Average rate of interest | . . . | 3½ and 4 per cent. |

STATISTICS OF CONSUMPTION OF WATER.

1. Estimated total population at date — 94,152.
2. Estimated population on lines of pipe — 94,152.
3. Estimated population supplied — 94,152.
4. Total consumption for the year — 2,930,553,545 gallons.
5. Passed through meters — 940,768,200 gallons.
6. Percentage of consumption metered — 32.
7. Average daily consumption — 8,028,914 gallons.
8. Gallons per day to each inhabitant — 85.27 on total and pumped.
9. Gallons per day to each inhabitant on domestic pumpage — 85.27.
10. Gallons per day to each tap — 551.
11. Cost of supplying water, per million gallons, figured on maintenance \$25.24.
12. Total cost of supplying water, per million gallons, figure total maintenance + interest on bonds, \$69.47.

STATISTICS RELATING TO DISTRIBUTION SYSTEM.

MAINS.

Kind of pipe — cast iron.

Sizes — From 2-inch to 40-inch.

Extended 4,392 feet during year.

a.—Discontinued 5,941½ feet during year.

b.—Renewed 5,941½ feet during year.

Total now in use — 125.12 miles.

Cost of repairs per mile — \$1.23.

Number of leaks per mile — .017.

Length of pipes less than 4 inches diameter — 3.26 miles.

Number of hydrants added during year — 23.

Number of hydrants (public) now in use—1,001.

Number of stop gates added during year — 39.

Range of pressure on mains — 45 lbs. to 55 lbs.

WATER

Kind of pipe - galvanized iron.
 Size - three fourth inch to two inches
 Length - 6,000 feet
 Total water - 11,115 miles
 Number of water taps added during year - 161
 Number of water - 11,115
 Average length of water - 41 feet
 Average cost of water for the year - \$17.40
 Number of water added - 254
 Number of water - 11,115
 Percentage of water metered - 15 per cent
 Percentage of receipts from metered water, 46 per cent

The following statement is from the report of the Commissioners of the Sinking Fund of the City of Cambridge, and shows the present condition of the Water Loan Sinking Fund :—

Dr.

The amount of the Fund, November 30, 1901, was . . \$757,731 54

Received during the year as follows :—

| | | |
|--|------------|--------------|
| From the Treasurer of the City of Cambridge, the annual required appropriation from the water rates, including surplus, viz. | 123,000 29 | |
| From interest on investments | 28,933 82 | |
| | <hr/> | \$909,665 65 |

Cr.

| | | |
|---|------------|--------------|
| Amount paid for accrued interest on investments purchased | 606 17 | |
| Amount paid for premiums on investments purchased | 1,423 50 | |
| Leaving the amount of the Fund, November 30, 1902 | 907,635 93 | |
| | <hr/> | \$909,665 65 |

| | |
|-------------------|--|
| FRANK A. ALLEN, | } <i>Commissioners
of the
Sinking Fund
of the City
of Cambridge.</i> |
| JOHN C. BULLARD, | |
| GEORGE H. HOWARD, | |
| ANDREW J. LOVELL, | |
| J. HENRY RUSSELL, | |
| DANA W. HYDE, | |

The following are the investments belonging to the Water Loan Funds :—

| | | | | |
|--|------------|-----------------|--------------|--------------------|
| Cambridge | City bonds | 3 1-2s, Matur'g | Nov. 1, 1912 | \$20,000 00 |
| " | " " | 4s, " | Feb. 1, 1913 | 2,000 00 |
| " | " " | 4s, " | Oct. 1, 1916 | 65,100 00 |
| " | " " | 3 1-2s, " | Dec. 1, 1917 | 40,000 00 |
| " | " " | 3 1-2s, " | Nov. 1, 1919 | 20,000 00 |
| " | " " | 4s, " | Nov. 1, 1920 | 5,000 00 |
| <i>Amount carried forward,</i> | | | | <hr/> \$162,100 00 |

| | | | | | | |
|---------------------------------|-------------|----------|---------------|----------------|-------------|--------------|
| Amount brought forward | | | | | | \$122,100 00 |
| 1900 | (City bonds | do | Maturing Jan. | 1, 1900 | \$10,000 00 | |
| Waldenfield | Town | do | | Oct. 1, 1900 | 2,000 00 | |
| Southboro | " | 3 15-100 | | Apr. 1, 1900 | 20,000 00 | |
| Providence, R. I. | (City | do | | July 1, 1900 | 20,000 00 | |
| Bell | Town | 3 1-2s | | Sept. 14, 1900 | 2,300 00 | |
| Waldenfield | " | do | | Oct. 1, 1900 | 4,000 00 | |
| Madison | (City | do | | Nov. 1, 1900 | 2,000 00 | |
| Troy & T | " | 3 1-2s | | Nov. 12, 1900 | 2,000 00 | |
| Waldenfield | Town | do | | Oct. 1, 1901 | 4,000 00 | |
| Madison | (City | do | | Nov. 1, 1901 | 2,000 00 | |
| Troy & T | " | 3 1-2s | | Nov. 12, 1901 | 2,000 00 | |
| Bell | Town | do | | May 1, 1902 | 2,000 00 | |
| Southboro | " | do | | Aug. 1, 1902 | 10,000 00 | |
| Waldenfield | " | 3 1-2s | | Oct. 12, 1902 | 4,000 00 | |
| Madison | (City | do | | Nov. 1, 1902 | 2,000 00 | |
| Troy & T | " | 3 1-2s | | Nov. 12, 1902 | 2,000 00 | |
| West Springfield | Town | 3 1-2s | | Dec. 1, 1902 | 12,000 00 | |
| New Bedford | (City | 3 1-2s | | Feb. 1, 1903 | 14,000 00 | |
| Madison | Town | do | | Aug. 1, 1903 | 12,000 00 | |
| Waldenfield | " | 3 1-2s | | Oct. 12, 1903 | 4,000 00 | |
| Madison | (City | do | | Nov. 1, 1903 | 2,000 00 | |
| Troy & T | " | 3 1-2s | | Nov. 12, 1903 | 2,000 00 | |
| Taunton | " | 3 1-2s | | June 1, 1910 | 21,000 00 | |
| Southboro | " | do | | July 1, 1910 | 4,000 00 | |
| Waldenfield | Town | 3 1-2s | | Oct. 12, 1910 | 4,000 00 | |
| Troy & T | (City | 3 1-2s | | Nov. 12, 1910 | 2,000 00 | |
| Taunton | " | 3 1-2s | | June 1, 1911 | 20,000 00 | |
| Waldenfield | Town | 3 1-2s | | Oct. 12, 1911 | 12,000 00 | |
| Southboro | (City | 3 1-2s | | Nov. 1, 1911 | 12,000 00 | |
| Troy & T | " | 3 1-2s | | Nov. 12, 1911 | 2,000 00 | |
| New Bedford | " | 3 1-2s | | Mar. 1, 1912 | 12,000 00 | |
| Framburg | " | 3 1-2s | | Apr. 1, 1912 | 10,000 00 | |
| Waldenfield | " | 3 1-2s | | July 1, 1912 | 22,000 00 | |
| Waldenfield | Town | do | | Oct. 1, 1912 | 1,000 00 | |
| Troy & T | (City | 3 1-2s | | Nov. 12, 1912 | 2,000 00 | |
| " | " | 3 1-2s | | Nov. 12, 1912 | 2,000 00 | |
| " | " | 3 1-2s | | Nov. 12, 1914 | 2,000 00 | |
| 1913 | " | do | | Jan. 1, 1913 | 14,000 00 | |
| Weymouth | Town | 3 1-2s | | May 1, 1913 | 2,300 00 | |
| Troy & T | (City | 3 1-2s | | Nov. 12, 1913 | 2,000 00 | |
| Weymouth | Town | 3 1-2s | | May 1, 1914 | 2,300 00 | |
| Weymouth | " | do | | Mar. 1, 1917 | 2,000 00 | |
| Weymouth | (City | do | | Apr. 1, 1917 | 24,000 00 | |
| Weymouth | Town | 3 1-2s | | May 1, 1917 | 2,300 00 | |
| Bainbridge, Me. | (City | do | | Jan. 1, 1918 | 12,000 00 | |
| Weymouth | Town | do | | Mar. 1, 1918 | 1,000 00 | |
| Weymouth | " | 3 1-2s | | May 1, 1918 | 2,300 00 | |
| " | " | 3 1-2s | | May 1, 1919 | 2,300 00 | |
| " | " | 3 1-2s | | May 1, 1920 | 2,300 00 | |
| Providence Water Light & L. Co. | do | | | Aug. 1, 1920 | 22,000 00 | |
| Framburg R. & L. Co. | 3 1-2s | | | Oct. 1, 1920 | 20,000 00 | |
| January | City bonds | do | | May 1, 1923 | 2,000 00 | |
| " | " | do | | May 1, 1924 | 1,000 00 | |
| Amount carried forward | | | | | | 224,500 00 |
| | | | | | | \$346,600 00 |

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| | |
|------------------------|--------------|
| | 185,000 00 |
| | \$831,900 00 |
| Cash in bank | 75,735 24 |
| | \$907,635 24 |

The Bonded Water Debt, which the foregoing Fund is to pay matures as follows:—

| | | |
|-------------------------|------------------|----------------|
| Nov. 1, 1906 | 31-2s | \$45,000 00 |
| Oct. 1, 1907 | 4s | 90,000 00 |
| Nov. 1, 1907 | 4s | 22,000 00 |
| July 1, 1908 | 4s | 45,000 00 |
| Aug. 1, 1908 | 4s | 25,000 00 |
| July 1, 1909 | 4s | 20,000 00 |
| May 1, 1910 | 4s | 288,000 00 |
| July 1, 1910 | 4s | 75,000 00 |
| Sept. 1, 1910 | 4s | 125,000 00 |
| Jan. 1, 1911 | 4s | 20,000 00 |
| Oct. 1, 1911 | 4s | 35,000 00 |
| Jan. 1, 1912 | 4s | 150,000 00 |
| May 2, 1912 | 4s | 75,000 00 |
| Nov. 1, 1912 | 4s | 45,000 00 |
| Feb. 1, 1913 | 4s | 100,000 00 |
| Aug. 1, 1913 | 4s | 50,000 00 |
| April 1, 1915 | 4s | 200,000 00 |
| Aug. 1, 1915 | 4s | 200,000 00 |
| April 1, 1916 | 4s | 100,000 00 |
| July 1, 1916 | 4s | 200,000 00 |
| Aug. 1, 1916 | 4s | 100,000 00 |
| Oct. 1, 1916 | 4s | 265,100 00 |
| April 1, 1917 | 3 1-2s | 200,000 00 |
| July 1, 1917 | 3 1-2s | 100,000 00 |
| Nov. 1, 1917 | 3 1-2s | 75,000 00 |
| ried forward , , , , , | | \$2,642,100 00 |

COMMISSIONER OF SINKING FUND

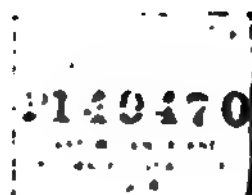
85

Amount brought forward

92,000,100 00

| | | | |
|--------------|-------|------------|---------------|
| Jan 1 : 1901 | 31-20 | | |
| Mar 1 : 1901 | 31-20 | 107,000 00 | |
| May 1 : 1901 | 31-20 | 20,000 00 | |
| Jul 1 : 1901 | 31-20 | 60,000 00 | |
| Sep 1 : 1901 | 31-20 | 20,000 00 | |
| Nov 1 : 1901 | 31-20 | 22,000 00 | |
| Dec 1 : 1901 | 31-20 | 20,000 00 | |
| Jan 1 : 1902 | 31-20 | 20,000 00 | |
| Mar 1 : 1902 | 31-20 | 12,500 00 | |
| May 1 : 1902 | 31-20 | 2,000 00 | |
| Jul 1 : 1902 | 00 | 20,000 00 | |
| | | | 701,500 00 |
| | | | 92,701,600 00 |

Annual Report



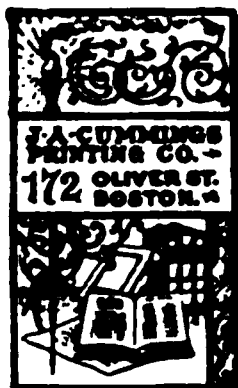
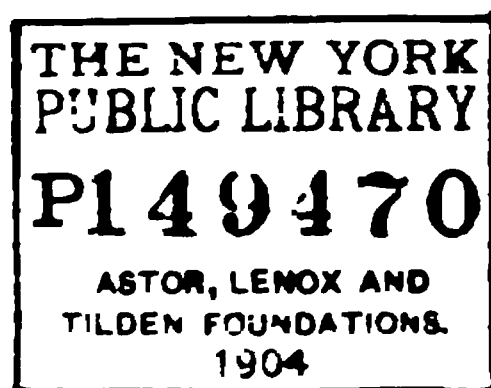
IE WATER BOARD

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City of Cambridge

MASSACHUSETTS

VDLA 12



CAMBRIDGE WATER BOARD

1904

President

WILLIAM B. DURANT

Members of the Board

EDWARD M. STEVENS

Term expires 1904

JOHN C. HOWARD

Term expires 1905

WILLIAM B. DURANT

Term expires 1906

OSCAR F. LADD

Term expires 1907

JOHN C. GREEN

Term expires 1908

WALTER H. HARDING, Clerk

Superintendent of Works

EDWIN C. BROOKS

Water Registrar

WALTER H. HARDING

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-1903.

| | |
|---------------------------|--------------------------|
| CHESTER W. KINGSLEY . . . | 1865-1894 |
| JOHN SARGENT | 1865-1871 |
| A. K. P. WELCH | 1865-1871 |
| ROBERT DOUGLASS | 1865-1871 |
| SAMUEL SLOCOMB | 1865-1876 |
| Z. L. RAYMOND | 1871 |
| HENRY L. EUSTIS | 1871-1885 |
| J. WARREN MERRILL . . . | 1871-1881 |
| GEORGE P. CARTER | 1871-1883 |
| JOHN H. LEIGHTON | 1876-1879 |
| KNOWLTON S. CHAFFEE . . | 1879-1889 |
| JAMES M. W. HALL | 1881-1899 |
| LEANDER M. HANNUM . . . | { 1883-1884
1885-1893 |
| JOHN F. O'BRIEN | 1884-1895 |
| GEORGE H. HOWARD | 1889- (Now in Office.) |
| E. BURT PHILLIPS | 1893-1896 |
| FRANK A. ALLEN | 1895-1899 |
| EDMUND H. STEVENS | 1899- (Now in Office.) |
| WILLIAM B. DURANT | 1899- (Now in Office.) |
| ANDREW J. RADY | 1903- (Now in Office.) |
| JOHN F. O'BRIEN | 1903- (Now in Office.) |

Presidents of the Board

| | |
|---------------------------|-----------|
| J. WARREN MERRILL . . . | 1865-1867 |
| ERZA PARMENTER | 1867 |
| JOHN SARGENT | 1867-1871 |
| J. WARREN MERRILL . . . | 1871-1873 |
| CHESTER W. KINGSLEY . . . | 1873-1876 |
| GEORGE P. CARTER | 1876-1883 |
| CHESTER W. KINGSLEY . . . | 1883-1894 |
| JAMES M. W. HALL | 1894-1899 |
| WILLIAM B. DURANT | 1899- |

FRESH POND.

In making up the annual estimates for the past year, the Board recommended an appropriation of ten thousand dollars for the purpose of completing some of the unfinished work around the Pond, especially the portion of Kingsley Park adjacent to the south side of the Pond, which has long been in a rough and unsightly condition. The City Council refused to make the appropriation and consequently nothing could be done. It seems to the Board to be short-sighted policy to neglect the improvement of the grounds around the Pond, for the sake of a temporary saving in the expense. Since the park development was begun in 1896, all the expense has been paid for out of surplus water receipts, and none from the issue of bonds. The Board trust that they will no longer be compelled, for lack of funds, to neglect this work, and recommend a suitable appropriation for the ensuing year, so that the work may be resumed in the spring or fall.

WATER BASINS.

The water in Hobbs Brook and Stony Brook basins remains at about the usual level, but the water in Fresh Pond is now 5.31 feet below high water mark, and only about 2.55 feet above the level of the intake pipe. In view of the increasing consumption of water, and the specially large consumption which is always a feature of cold weather, and for other reasons hereinafter set forth, the Board have taken precaution to prevent a water famine by causing a connection to be made with the pipe of the Metropolitan Water and Sewerage Board, who have consented to supply the City temporarily, in case of sudden need. The connection has been made with the pipe where it crosses the Common, in order to avoid disturbing the surface of any street. A Venturi meter has been connected with the pipe so that the water supplied may be accurately measured and paid for according to the quantity consumed. The Board acknowledge with gratitude the courtesy of the Metropolitan Water and Sewerage Board, in lending their aid to provide for the emergency which confronts the City.

STONY BROOK OVERFLOW.

The overflow at Stony Brook dam this year shows a considerable decrease, as compared with that of the year preceding, in spite of a larger rainfall this year.

The Board have done all that is in their power, in presenting the facts, and requesting your prompt action. Until you act, the Board is unable to do the proper thing to do.

Respectfully submitted,

WILLIAM B. DURANT,

GEORGE H. HOWARD,

JOHN F. O'BRIEN,

ANDREW J. EADY,

EDMUND H. STEVENS,

Com. Sec. Water Board.

Statement of yearly revenue received from water rates since the purchase of the works by the City : —

| | |
|--|-------------|
| From April 28, 1865, to December 1, 1865 | \$32,367 19 |
| From December 1, 1865, to December 1, 1866 | 40,073 27 |
| From December 1, 1866, to December 1, 1867 | 53,733 62 |
| From December 1, 1867, to December 1, 1868 | \$63,747 42 |
| From December 1, 1868, to December 1, 1869 | 76,149 30 |
| From December 1, 1869, to December 1, 1870 | 92,605 95 |
| From December 1, 1870, to December 1, 1871 | 111,782 65 |
| From December 1, 1871, to December 1, 1872 | 127,201 30 |
| From December 1, 1872, to December 1, 1873 | 146,117 32 |
| From December 1, 1873, to December 1, 1874 | 153,634 27 |
| From December 1, 1874, to December 1, 1875 | 138,880 37 |
| From December 1, 1875, to December 1, 1876 | 179,166 76 |
| From December 1, 1876, to December 1, 1877 | 154,843 59 |
| From December 1, 1877, to December 1, 1878 | 157,443 91 |
| From December 1, 1878, to December 1, 1879 | 164,681 90 |
| From December 1, 1879, to December 1, 1880 | 173,325 49 |
| From December 1, 1880, to December 1, 1881 | 170,062 73 |
| From December 1, 1881, to December 1, 1882 | 177,430 80 |
| From December 1, 1882, to December 1, 1883 | 179,361 89 |
| From December 1, 1883, to December 1, 1884 | 161,526 27 |
| From December 1, 1884, to December 1, 1885 | 185,544 36 |
| From December 1, 1885, to December 1, 1886 | 199,404 43 |
| From December 1, 1886, to December 1, 1887 | 204,748 64 |
| From December 1, 1887, to December 1, 1888 | 211,156 27 |
| From December 1, 1888, to December 1, 1889 | 221,124 70 |
| From December 1, 1889, to December 1, 1890 | 231,116 32 |
| From December 1, 1890, to December 1, 1891 | 227,054 53 |
| From December 1, 1891, to December 1, 1892 | 237,527 08 |
| From December 1, 1892, to December 1, 1893 | 242,219 78 |
| From December 1, 1893, to December 1, 1894 | 250,032 71 |
| From December 1, 1894, to December 1, 1895 | 268,813 62 |
| From December 1, 1895, to December 1, 1896 | 281,030 00 |
| From December 1, 1896, to December 1, 1897 | 291,457 62 |
| From December 1, 1897, to December 1, 1898 | 297,129 78 |
| From December 1, 1898, to December 1, 1899 | 302,569 00 |
| From December 1, 1899, to December 1, 1900 | 319,479 37 |
| From December 1, 1900, to December 1, 1901 | 320,468 01 |
| From December 1, 1901, to December 1, 1902 | 323,500 53 |
| From December 1, 1902, to December 1, 1903 | 333,777 34 |

There has been abated :—

| | |
|---|------------|
| Water rates, off and on, and seals, supplies and repairs,
and Construction account | \$3,756 45 |
|---|------------|

There remains uncollected :—

| | | |
|--------------------------------|------------|--------------|
| Water rates | \$4,622 73 | |
| Supplies and repairs | 769 45 | |
| Off and on | 130 00 | |
| Seals | 10 00 | |
| Maintenance account | 600 96 | |
| Construction account | 269 33 | |
| | <hr/> | \$358,664 77 |

EXPENDITURES.

| | | |
|--|-------------|-------------|
| Construction (General account) | \$26,353 55 | |
| Maintenance (General account) | 64,289 51 | |
| | <hr/> | \$90,643 06 |

ABATEMENTS.

| | |
|--|------------|
| Water rate, and supply and repair bills to the amount of | \$3,756 45 |
|--|------------|

REFUNDS.

| | | |
|---|--------------|--------------|
| Water rates to the amount of | \$3,169 06 | |
| Which amount deducted from receipts | 386,946 40 | |
| | <hr/> | |
| Leaves net receipts for water | \$333,777 34 | |
| Add off and on, fines, rents, seals and Maintenance account | 1,571 10 | |
| | <hr/> | |
| Makes net receipts of rates, fines, etc. | | \$335,348 44 |

OFF AND ON.

Water has been shut off for non-payment of rates, or per order on account of vacancy, and seals have been applied to fixtures by request of owners, as follows :—

| | |
|--|-----|
| Water shut off in 1903 | 684 |
| Supplies let on, shut off in 1903 | 517 |
| Supplies let on, shut off in previous years | 98 |
| New supplies let on | 136 |
| Seal locks applied to fixtures in 1903 | 738 |
| Seal locks removed, put on in 1903 | 385 |
| Seal locks removed, put on in previous years | 364 |

The excess of receipts in 1903 as shown above, amounting to \$1,923.28, has been carried to the sinking fund as required by law.

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 17,811 families, 619 stables, 1,857 horses, 95 cows, 173 shops, 381 offices and stores, by the following fixtures, viz: —

| | |
|---------------------|---------------------|
| 20,585 faucets, | 34 urinals, |
| 7,516 wash basins, | 7 yard hydrants, |
| 10,787 wash tubs, | 1 fountain. |
| 7,005 bath tubs, | 18 tumbler washers. |
| 186 slop closets, | 1,913 hand hose, |
| 17,968 pan closets, | 6 motors. |
| 4 hopper closets, | |

Also,

1,005 fire hydrants (beside 19 on private premises).
 8 fire reservoirs.
 28 drinking fountains in public squares.
 62 street watering standpipes.
 4 public sanitaries.

The above schedule of fixtures does not include those in schoolhouses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made with very satisfactory results.

Respectfully submitted,

WALTER H. HARDING,
Registrar.

STATEMENT OF THE WATER REGISTRAR.

There remains uncollected : —

| | | | |
|--------------------------------------|------------|--------------------|---------------------|
| Water rates | \$4,622 73 | | |
| Supplies and repairs | 769 45 | | |
| Off and on | 130 00 | | |
| Seals | 10 00 | | |
| Maintenance account | 600 96 | | |
| Construction account | 269 83 | | |
| | | <u>\$6,402 47</u> | <u>\$358,664 77</u> |
| Total bills for collection | | \$358,664 77 | |
| Less abated | \$3,756 45 | | |
| Less refunded | 3,169 06 | | |
| Less unpaid | 6,402 47 | | |
| | | <u>\$13,327 98</u> | |
| Net receipts | | | \$345,336 79 |

Attest :

WALTER H. HARDING,
Registrar.

CAMBRIDGE, December 15, 1903.

We have examined the accounts of the Water Registrar and find that they correspond in the amounts collected, abated, refunded, and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor.

WILLIAM B. DURANT,
Committee on Accounts.

STREET WATERING STANDPIPES.

At this date, November 30, 1903, there are sixty-two (62) street watering standpipes in use.

During the year one standpipe has been added to the list; it was on Granite Street.

The standpipe which was formerly located at the corner of Mair Street and Portland Street has been removed and set in Albany Street opposite Ivers & Pond Piano Company's factory.

During the year the standpipes in thirty-three (33) locations have been repaired, and the cost of such repairs charged to the Street Department.

GATES.

Twenty-three (23) gates have been set. (See recapitulation table on page 37.)

Three (3) on extension of main pipes.

Eleven (11) on renewal of main pipes.

Nine (9) on supplies.

The inspections of gates have been made and the locations where necessary carefully marked.

BOXES.

The total number of boxes set during the year was fifty-three (53).

Fourteen (14) iron boxes have been set on extension and renewal work.

Four (4) special meter boxes have been set with meters.

Nine (9) iron boxes have been set on new supplies.

Twenty (20) boxes have been set in places of worthless ones removed.

Six (6) meter boxes.

In seven (7) locations the boxes have been lowered.

In ten (10) locations the boxes have been raised.

In four (4) locations the boxes have been repaired, and

In two (2) locations gate boxes have been reset

And on public buildings, schools, etc. :—

| | 5-8
inch. | 3-4
inch. | 1
inch. | 1 1-2
inches. | 2
inches. | Total. |
|-------------------|--------------|--------------|------------|------------------|--------------|--------|
| Ball & Fitts..... | | | 1 | | | 1 |
| Crown | 1 | | 2 | | | 3 |
| Hersey..... | 1 | 11 | 15 | | 1 | 28 |
| Trident..... | 5 | 2 | 10 | 1 | | 18 |
| Thomson..... | | | | 1 | | 1 |
| Union Rotary..... | | | | 1 | 1 | 2 |
| Worthington..... | | 3 | 6 | | | 9 |
| Total | 7 | 16 | 34 | 3 | 2 | 62 |

During the year there were two hundred thirty-seven (237) meters added to the list as follows :—

| | 5-8
inch. | 3-4
inch. | 1
inch. | 1 1-2
inches. | 2
inches. | 3
inches. | 4
inches. | Total. |
|-------------------|--------------|--------------|------------|------------------|--------------|--------------|--------------|--------|
| Crown ..:..... | 1 | 2 | | | 1 | | 1 | 5 |
| Hersey..... | 47 | 14 | 9 | | 1 | | | 71 |
| Lambert..... | 56 | 9 | 3 | | | | | 68 |
| Trident | 67 | 9 | 4 | 1 | | | | 81 |
| Union Rotary..... | 2 | 2 | | | 2 | 1 | 1 | 8 |
| Worthington | 3 | | | 1 | | | | 4 |
| Total..... | 176 | 36 | 16 | 2 | 4 | 1 | 2 | 237 |

STONY BROOK PIPE LINE.

The work of raising a portion of this pipe in Waltham along the banks of the river, which was in progress at the date of the last report, was completed. It required the raising of about six hundred feet in length from one to three feet.

The portion in Pleasant Street, Watertown, which was too high to admit the change in grade of the street contemplated by the town authorities, was lowered for a distance of about eight hundred feet from one to three feet. This portion was through ledge, and the work was successfully accomplished without shutting off the water from the main.

For an account of the work done on this line during the past year I would refer to the report of Mr. Freeman C. Coffin, which is attached.

STONY BROOK.

The care for the drainage of this water shed has required the construction of three more cesspools this season, making twenty-one cesspools and nineteen vaults on this shed, all of which are cared for by this department outfit.

| STONY BROOK. | | | | | HOBBS BROOK. | | | | | REMARKS. | | |
|----------------|---|--|----------------|--|--|---|--|----------------|---|--|-------------------------------|----------------------------------|
| | | | | | LINCOLN STREET BASIN.
Dam Number 1. | | WINTER STREET BASIN.
Dam Number 2. | | | | Flash-boards
removed. | Flash-boards
set. |
| Date. | Lowest
elevation
during
month. | Highest
elevation
during
month. | Rain-
fall. | | Date. | Lowest
elevation
during
month. | Highest
elevation
during
month. | Date. | Lowest
elevation
during
month. | Highest
elevation
during
month. | | |
| Dec. 16, 1902 | 80.63 | 81.79 | 5.68 | | Dec. 15, 1902 | 180.53 | 181.20 | Dec. 1, 1902 | 178.48 | 180.55 | ..... | ..... |
| Dec. 23, 1902 | ..... | ..... | ..... |  | Dec. 22, 1902 | ..... | ..... | Dec. 31, 1902 | ..... | ..... | ..... | ..... |
| Jan. 20, 1903 | 81.83 | 81.65 | 3.77 | | Jan. 1, 1903 | 180.78 | 181.50 | Jan. 1, 1903 | 180.55 | 181.55 | ..... | ..... |
| Jan. 22, 1903 | ..... | ..... | ..... |  | Jan. 23, 1903 | ..... | ..... | Jan. 23, 1903 | ..... | ..... | ..... | ..... |
| Feb. 25, 1903 | 81.33 | 81.92 | 4.01 | | Feb. 26, 1903 | 181.35 | 181.60 | Feb. 26, 1903 | 181.30 | 181.55 | ..... | ..... |
| Feb. 5, 1903 | ..... | ..... | ..... |  | Feb. 28, 1903 | ..... | ..... | Feb. 5, 1903 | ..... | ..... | ..... | ..... |
| Mar. 21, 1903 | 81.50 | 82.25 | 6.13 | | Mar. 20, 1903 | 181.48 | 181.80 | Mar. 20, 1903 | 181.43 | 181.70 | ..... | ..... |
| Mar. 24, 1903 | ..... | ..... | ..... |  | Mar. 24, 1903 | ..... | ..... | Mar. 24, 1903 | ..... | ..... | ..... | ..... |
| Apr. 30, 1903 | 81.33 | 82.07 | 3.87 | | Apr. 30, 1903 | 181.38 | 181.75 | Apr. 30, 1903 | 181.33 | 181.65 | ..... | ..... |
| Apr. 10, 1903 | ..... | ..... | ..... |  | Apr. 9, 1903 | ..... | ..... | Apr. 10, 1903 | ..... | ..... | ..... | ..... |
| May 31, 1903 | 80.06 | 81.31 | .80 | | May 28, 1903 | 181.10 | 181.38 | May 28, 1903 | 181.08 | 181.33 | ..... | ..... |
| May 1, 1903 | ..... | ..... | ..... |  | May 1, 1903 | ..... | ..... | May 1, 1903 | ..... | ..... | ..... | ..... |
| June 4, 1903 | 79.85 | 82.12 | 7.45 | | June 11, 1903 | 180.90 | 181.80 | June 8, 1903 | 180.75 | 181.75 | June 1, 1903
Removed 1st | June 7, 1903
Set 2d |
| June 23, 1903 | | | | | June 22, 1903 | | | June 22, 1903 | | | June 4, 1903
Removed 2d | June 12, 1903
Set 1st |
| July 18, 1903 | 80.83 | 81.50 | 3.48 | | July 18, 1903 | 181.20 | 181.48 | July 18, 1903 | 181.15 | 181.43 | ..... | ..... |
| July 2, 1903 | ..... | ..... | ..... |  | July 1, 1903 | ..... | ..... | July 1, 1903 | ..... | ..... | ..... | ..... |
| Aug. 20, 1903 | 80.10 | 81.23 | 3.66 | | Aug. 28, 1903 | 181.05 | 181.35 | Aug. 29, 1903 | 180.93 | 181.30 | Aug. 20, 1903
Removed 1st | Aug. 27, 1903
Set 1st |
| Aug. 7, 1903 | | | | | Aug. 7, 1903 | | | Aug. 7, 1903 | | | Sept. 9, 1903
Removed 1st | Sept. 12, 1903
Set 1st |
| Sept. 17, 1903 | 80.04 | 81.00 | 1.99 | | Sept. 30, 1903 | 180.50 | 181.10 | Sept. 30, 1903 | 180.40 | ..... | ..... | ..... |
| Sept. 9, 1903 | ... | | | | Sept. 6, 1903 | | | Sept. 7, 1903 | | 181.00 | Sept. 15, 1903
Removed 1st | Sept. 17, 1903
Removed 2d |
| | | | | | | | | | | | Sept. 22, 1903
Removed 3d | Sept. 23, 1903
Removed 4th |
| Oct. 1, 1903 | 80.40 | 81.33 | 4.19 | | Oct. 1, 1903 | 180.50 | 180.90 | Oct. 8, 1903 | 180.20 | | | Oct. 10, 1903
Set 4th |
| Oct. 19, 1903 | | | | | Oct. 18, 1903 | | | Oct. 31, 1903 | | 180.75 | | Oct. 12, 1903
Set 8d, 2d, 1st |
| Nov. 12, 1903 | 80.00 | 81.00 | 1.44 | | Nov. 1, 1903 | 180.77 | 180.80 | Nov. 16, 1903 | 180.63 | ..... | ..... | ..... |
| Nov. 21, 1903 | ..... | ..... | ..... |  | Nov. 30, 1903 | ..... | ..... | Nov. 28, 1903 | ..... | ..... | ..... | ..... |
| | | | 46.97 | | | | | | | | | 47.42 |

Gates closed during entire year.

WATER SUPPLY SYSTEM FOR THE CITY OF BOSTON

| Year | Population | Area | Water | Cost |
|------|------------|-------|---------|-------------|
| 1880 | 110,000 | 1,000 | 100,000 | \$1,000,000 |
| 1885 | 120,000 | 1,100 | 110,000 | \$1,100,000 |
| 1890 | 130,000 | 1,200 | 120,000 | \$1,200,000 |
| 1895 | 140,000 | 1,300 | 130,000 | \$1,300,000 |
| 1900 | 150,000 | 1,400 | 140,000 | \$1,400,000 |
| 1905 | 160,000 | 1,500 | 150,000 | \$1,500,000 |
| 1910 | 170,000 | 1,600 | 160,000 | \$1,600,000 |
| 1915 | 180,000 | 1,700 | 170,000 | \$1,700,000 |
| 1920 | 190,000 | 1,800 | 180,000 | \$1,800,000 |
| 1925 | 200,000 | 1,900 | 190,000 | \$1,900,000 |
| 1930 | 210,000 | 2,000 | 200,000 | \$2,000,000 |
| 1935 | 220,000 | 2,100 | 210,000 | \$2,100,000 |
| 1940 | 230,000 | 2,200 | 220,000 | \$2,200,000 |
| 1945 | 240,000 | 2,300 | 230,000 | \$2,300,000 |
| 1950 | 250,000 | 2,400 | 240,000 | \$2,400,000 |
| 1955 | 260,000 | 2,500 | 250,000 | \$2,500,000 |
| 1960 | 270,000 | 2,600 | 260,000 | \$2,600,000 |
| 1965 | 280,000 | 2,700 | 270,000 | \$2,700,000 |
| 1970 | 290,000 | 2,800 | 280,000 | \$2,800,000 |
| 1975 | 300,000 | 2,900 | 290,000 | \$2,900,000 |
| 1980 | 310,000 | 3,000 | 300,000 | \$3,000,000 |
| 1985 | 320,000 | 3,100 | 310,000 | \$3,100,000 |
| 1990 | 330,000 | 3,200 | 320,000 | \$3,200,000 |
| 1995 | 340,000 | 3,300 | 330,000 | \$3,300,000 |
| 2000 | 350,000 | 3,400 | 340,000 | \$3,400,000 |
| 2005 | 360,000 | 3,500 | 350,000 | \$3,500,000 |
| 2010 | 370,000 | 3,600 | 360,000 | \$3,600,000 |
| 2015 | 380,000 | 3,700 | 370,000 | \$3,700,000 |
| 2020 | 390,000 | 3,800 | 380,000 | \$3,800,000 |
| 2025 | 400,000 | 3,900 | 390,000 | \$3,900,000 |
| 2030 | 410,000 | 4,000 | 400,000 | \$4,000,000 |
| 2035 | 420,000 | 4,100 | 410,000 | \$4,100,000 |
| 2040 | 430,000 | 4,200 | 420,000 | \$4,200,000 |
| 2045 | 440,000 | 4,300 | 430,000 | \$4,300,000 |
| 2050 | 450,000 | 4,400 | 440,000 | \$4,400,000 |
| 2055 | 460,000 | 4,500 | 450,000 | \$4,500,000 |
| 2060 | 470,000 | 4,600 | 460,000 | \$4,600,000 |
| 2065 | 480,000 | 4,700 | 470,000 | \$4,700,000 |
| 2070 | 490,000 | 4,800 | 480,000 | \$4,800,000 |
| 2075 | 500,000 | 4,900 | 490,000 | \$4,900,000 |
| 2080 | 510,000 | 5,000 | 500,000 | \$5,000,000 |
| 2085 | 520,000 | 5,100 | 510,000 | \$5,100,000 |
| 2090 | 530,000 | 5,200 | 520,000 | \$5,200,000 |
| 2095 | 540,000 | 5,300 | 530,000 | \$5,300,000 |
| 2100 | 550,000 | 5,400 | 540,000 | \$5,400,000 |

Source: U.S. Census Bureau, "Population of the United States, 1880-1990"

Population

Area

Water Supply System

Cost of Water Supply System

REPORT OF THE PUMPING ENGINEER

PUMPING STATION, CAMBRIDGE WATER WORKS,
December 1, 1903.

Mr. EDWIN C. BROOKS, *Supt.*

MY DEAR SIR:— I would report the machinery at the pumping station in good condition.

During the year the Worthington Engine No. 1 has been run sixty hours forty-five minutes, and Worthington Engine No. 2 has been run sixty hours. Aside from this, the Leavitt Engine No. 7 has pumped all of the water used by the City.

The tubes in No. 1 Receiver on Leavitt Engine No. 7 have been repacked.

I would recommend the changing the tubes in No. 1 Receiver on Engine No. 7 to a copper coil the same as in No. 2 Receiver in order to avoid repacking every year; this can be done at a small expense, as the material taken out and sold will nearly pay for the copper coil.

There has been a jacket and boiler feed pump attached to Engine No. 7; this change saves the expense of running two auxiliary pumps. It was designed and manufactured here at the pumping station at the cost of castings only.

By permission of the Water Board the pump and receiver formerly used for jacket pump were exchanged for a Fort Wayne twenty-ampere forty-light dynamo to be run through the night. This is connected to our small shop engine and saves from four hundred to five hundred pounds of coal per night over our large light engine, which is very wasteful running with a light load.

A mercury column and float gauge has been placed in the engine room; very accurate readings are thus obtained as to head pumped against heights of water in pond and reservoir.

The boilers are in good condition, but will require new brick arches in the fire boxes this coming year.

The fire room walls and boilers have been painted by the employees of the station.

The amount of coal used at the station during the "coal strike" last year (amount of burning as high as sixteen per centum ash) has cut down the cost of materials, i. e., 1902, 115,974.46; 1903, 111,844.88.

Respectfully submitted,

E. I. HARRIS,

Chief Engineer

OPERATING EXPENSES AT PUMPING
STATION.

| | |
|--|-------------|
| Coal | \$12,618.38 |
| Express | 15.85 |
| Oil, grease and packing | 435.60 |
| Repairs on engines and boilers | 310.59 |
| Repairs on buildings | 225.92 |
| Telephone | 69.51 |
| Tools and hardware | 90.71 |
| Miscellaneous | 44.68 |
| Salaries | 6,893.47 |
| | <hr/> |
| | \$20,704.71 |

SUMMARY OF STATISTICS

FOR THE YEAR ENDING NOVEMBER 30, 1903.

In form recommended by the New England Water Works Association.

CAMBRIDGE WATER WORKS.

CITY OF CAMBRIDGE, COUNTY OF MIDDLESEX, STATE OF MASSACHUSETTS.

GENERAL STATISTICS.

Population by census of 1900 — 91,886.

Date of construction — 1855.

By whom owned — City of Cambridge.

Source of supply — Hobbs Brook and Stony Brook in Lincoln, Waltham and Weston, and Fresh Pond in Cambridge.

Mode of supply (whether gravity or pumping) — Gravity from Hobbs and Stony Brooks to Fresh Pond, pumping from Fresh Pond to Payson Park Reservoirs, thence by gravity to consumers.

PUMPING STATISTICS.

1. Builders of pumping machinery — One Leavitt, built by Groshon High Duty Pumping Engine Company; two Worthington; one Blake.

2. Description of fuel used — *a.* Kind — bituminous.

b. Brand of coal — Cumberland.

c. Price of coal per gross ton, delivered, Dec., 1902, \$7.25; Jan., 1903, \$9.50; Feb., 1903, \$8.10; April, 1903, \$5.30; June, 1903, \$5.39; Sept., 1903, \$5.23; Nov., 1903, \$4.20.

3. Coal consumed for the year — 4,462,469 lbs.

4. (Pounds of wood consumed) \div 3 = equivalent amount of coal, 500 lbs.

5. Total equivalent coal consumed for the year = (3) + (4), 4,462,969 lbs.

| | | | | | | |
|--------------------------------|---|---|---|---|------------------|--------------------|
| <i>Amounts brought forward</i> | . | . | . | . | \$13,141 66 | \$316,398 4 |
| Special : | | | | | | |
| Hobbs Brook | . | . | | | \$12,229 61 | |
| Stony Brook Main | . | | | | 3,482 18 | |
| | | | | | <u>15,711 79</u> | |
| Total construction | . | . | . | . | | 28,853 4 |
| Unclassified expenses | . | . | . | . | | 6,925 4 |
| | | | | | | <u>\$352,177 4</u> |

| | | | | | |
|-------------------------------|---|---|---|---|--------------------|
| Net cost of works to date | . | . | . | . | \$5,750,655 15 |
| Bonded debt at date | . | . | . | . | 3,350,600 00 |
| Value of Sinking Fund at date | . | . | . | . | 1,062,821 46 |
| Average rate of interest | . | . | . | | 3½ and 4 per cent. |

STATISTICS OF CONSUMPTION OF WATER.

- 1. Estimated total population at date — 96,685.
- 2. Estimated population on lines of pipe — 96,685.
- 3. Estimated population supplied — 96,685.
- 4. Total consumption for the year — 3,160,704,360 gallons.
- 5. Passed through meters — 1,074,317,752 gallons.
- 6. Percentage of consumption metered — 34 per cent.
- 7. Average daily consumption, 8,659,463 gallons.
- 8. Gallons per day to each inhabitant — 89.56.
- 9. Gallons per day to each consumer — 89.56.
- 10. Gallons per day to each tap, 589.
- 11. Cost of supplying water, per million gallons, figured on total maintenance, \$19.55.
- 12. Total cost of supplying water, per million gallons, figured on total maintenance + interest on bonds, \$60.31.

STATISTICS RELATING TO DISTRIBUTION SYSTEM.

MAINS.

- Kind of pipe — cast iron.
- Sizes — From 2-inch to 40-inch.
- Extended 1,209 feet during year.
 - a. — Discontinued 5,661½ feet during year.
 - b. — Renewed 5,661½ feet during year.

Total mileage 125.25 miles

Cost of repairs per mile \$5.05

Number of gates per mile 10.7

Length of pipes less than 4 inch diameter 3.21 miles

Number of hydrants added during year 1905 6

Number of hydrants public and private now in use 1,005

Number of hydrants added during year 1905 14

Number of hydrants smaller than 4 inch None

Length of service mains 45.25 to 55.25

PIPELINES

Number of pipes installed 1905

Number of pipes 4 inch to two inches 300 ft, 4 inch, 6 inch

and 8 inch 100 ft

Length of pipes 100 feet

Cost of pipes 111.10 miles

Number of pipes added during year 1905 125

Number of pipes 11,000

Length of pipes 100 feet 15 feet

Cost of pipes for the year \$17.51

Number of pipes added 2.57

Number of pipes 2,125

Number of pipes installed 15 per cent

The following statement is from the report of the Commissioners of the Sinking Fund of the City of Cambridge, and shows the present condition of the Water Loan Sinking Fund:—

WATER WORKS FUND.

BOND ACCOUNT.

| | |
|---|--------------|
| Amount of bonds in the Fund, November 30, 1902 | \$831,900 00 |
| Amount of bonds purchased during the year | 73,000 00 |
| | <hr/> |
| Amount of bonds, at par value, in the Fund
November 30, 1903 | \$904,900 00 |

CASH ACCOUNT.

| | |
|--|----------------|
| Cash on hand, November 30, 1902 | \$75,735 98 |
| Cash received from Water Rates, Fines, etc. | 123,145 78 |
| Cash received for interest on investments | 34,437 99 |
| | <hr/> |
| | \$233,319 75 |
| Cash paid for bonds purchased | \$73,000 00 |
| Cash paid for premium on bonds purchased | 1,803 10 |
| Cash paid for accrued interest on bonds purchased | 595 19 |
| | <hr/> |
| | 75,398 29 |
| Cash on hand, November 30, 1903 | \$157,921 46 |
| | <hr/> |
| Total amount of the Water Works Sinking Fund,
November 30, 1903 | \$1,062,821 46 |

| | | | |
|----------|------------------|---|-----------|
| (Signed) | FRANK A. ALLEN, | } | Committee |
| | JOHN C. BULLARD, | } | on |
| | | | Accounts. |

The following are the investments belonging to the Water Loan Funds:—

| | | | | |
|----------------------------------|------------|-----------------------|--------------|--------------|
| Cambridge | City bonds | 3 1-2s, Maturing Nov. | 1, 1912 | \$20,000 00 |
| " | " | 4s, " | Feb. 1, 1913 | 2,000 00 |
| " | " | 4s, " | Oct. 1, 1916 | 65,100 00 |
| " | " | 3 1-2s, " | Dec. 1, 1917 | 40,000 00 |
| " | " | 3 1-2s, " | Nov. 1, 1919 | 20,000 00 |
| " | " | 4s, " | Nov. 1, 1920 | 5,000 00 |
| | | | | <hr/> |
| Amount carried forward | | | | \$152,100 00 |

ROUTE No. 1.

ESTIMATE OF COST.

| | | |
|--|--|----------|
| 84,000 feet 30-inch pipe, at \$7.25 | | \$609.00 |
| 6 30-inch gates and chambers | | 2.4 |
| 10 manholes and blow-offs | | 3.0 |
| Connection with present pipe and meters | | 2.5 |
| Other special castings | | 2.0 |
| | | \$618.9 |
| Add 25 per cent. for engineering and contingencies | | 64.1 |
| | | \$683.0 |

ROUTE No. 2.

ESTIMATE OF COST OF LINE FROM IRVING STREET, WATERTOWN FRESH POND.

| | | | | |
|--------|--|--------|---|---------|
| 16,103 | cubic yards earth excavation, 0 to 7 feet deep, at | \$ 60 | . | \$9,6 |
| 7,815 | " " " " 7 to 14 " " at | 1 00 | . | 7,8 |
| 625 | " " " " 14 to 21 " " at | 1 50 | . | 9 |
| 1,841 | " " " or rock in tunnel . . at | 10 00 | . | 18,4 |
| 845 | " " rock excavation . . . at | 5 00 | . | 4,4 |
| 776 | " " " " 7 to 14 feet deep, at | 6 00 | . | 4,6 |
| 115 | " " " " 14 to 21 " " at | 7 00 | . | 8 |
| 18 | " " " " 21 to 25 " " at | 8 00 | . | 1 |
| | | | | <hr/> |
| | | | | \$46,8 |
| 12,350 | feet 48-inch concrete conduit . . . at | 4 50 | . | 55,8 |
| 150 | feet 48-inch C. I. pipe . . . at | 11 00 | . | 1,6 |
| | Connection at Irving Street, 2-30-inch to 48-inch . . . | | . | 1,0 |
| 4 | 30-inch gates . . . at | 275 00 | . | 1,1 |
| | Entrance chambers | | . | 1,0 |
| | Outlet into Fresh Pond | | . | 2,0 |
| | Restoring street surfaces | | . | 1,4 |
| | Gate and manhole chambers | | . | 6 |
| | | | | <hr/> |
| | | | | \$111,1 |
| | Add 25 per cent. for engineering and contingencies . . . | | . | 27,7 |
| | | | | <hr/> |
| | | | | \$138,9 |
| | Add land damages and damage to buildings | | . | 50,0 |
| | | | | <hr/> |
| | | | | \$188,9 |

ESTIMATE OF COST OF ADDITIONS OR MODIFICATIONS TO ROUTE N

30-Inch Cast Iron Pipe.

(a) FROM IRVING STREET TO WALTHAM STATION.

| | | |
|--|--------------|---------|
| 16,000 feet 30-inch pipe | at \$ 7 25 . | \$116,0 |
| 4 30-inch gates and chambers | at 400 00 . | 1,6 |
| 6 blowholes and blow-offs | at 300 00 . | 1,8 |
| Connections with present pipe and meters | | 2,5 |
| Other special castings | | 1.0 |
| | | <hr/> |
| | | \$122,9 |
| Add 25 per cent. | | 30,7 |
| | | <hr/> |
| | | \$153,6 |

ROUTE No. 4.

ESTIMATE OF COST.

Concrete Conduit 8,900 feet long.

| | | | | | | | |
|--------|--------------------------------------|-------------------|----|----|----------|---|-------------|
| 13,270 | cubic yards earth excavation, | 0 to 8 feet deep, | at | \$ | 50 | . | \$6,635 00 |
| 2,988 | " | " | " | " | 8 to 14 | " | 2,644 20 |
| 808 | " | " | " | " | 14 to 20 | " | 878 75 |
| 1,414 | " | rock | " | " | 0 to 8 | " | 5,896 00 |
| 826 | " | " | " | " | 8 to 14 | " | 1,956 00 |
| 84 | " | " | " | " | 14 to 20 | " | 238 00 |
| | | | | | | | \$17,747 95 |
| 8,900 | lineal feet 36-inch concrete conduit | | | at | 3 50 | . | 31,150 00 |
| | | | | | | | \$48,897 95 |

Cast Iron Pipe Line.

| | | | | | | |
|---|---|---|---|---|--------------|--------------|
| 34,150 | feet 24-inch pipe, laid at \$5 00 complete, | . | . | . | \$170,750 00 | |
| 2,000 | cubic yards rock excavation, at \$4.00, | . | . | . | 8,000 00 | |
| 10 | 24-inch gates and chambers, | . | . | . | 8,000 00 | |
| 10 | manholes and blow-offs, | . | . | . | 2,500 00 | |
| | Meter and connection, | . | . | . | 1,500 00 | |
| | Gate-house and outlet at Fresh Pond, | . | . | . | 2,500 00 | |
| | Intake and connection at Hobbs Brook, | . | . | . | 6,000 00 | |
| | Special castings, | . | . | . | 4,000 00 | |
| | | | | | | \$198,250 00 |
| | | | | | | \$247,147 95 |
| Add 25 per cent. for engineering and contingencies, | | | | | | 61,786 90 |
| | | | | | | \$308,934 94 |
| Land damages, rights of way, etc., | | | | | | 30,000 00 |
| | | | | | | \$338,934 94 |

ROUTE No. 4.

MODIFICATION (a) CONNECTED TO PRESENT LINE AT NEWTON STREET

Estimate of Cost.

| | | | | | | |
|-----------------------------------|---|---|---|---|-------------|--------------|
| 8,900 | feet concrete conduit, same as in estimate of Route No. 4 | . | . | . | \$48,898 00 | |
| 12,500 | feet 24-inch pipe, laid, at \$4 80 | . | . | . | \$60,000 00 | |
| 1,800 | yards rock, at \$4.00 | . | . | . | 7,200 00 | |
| 5 | 24-inch gates and chambers at \$300 00 | . | . | . | 1,500 00 | |
| 5 | manholes and blow-offs | . | . | . | 1,250 00 | |
| | Intake and connection at Hobbs Brook | . | . | . | 6,000 00 | |
| | Special castings | . | . | . | 2,000 00 | |
| | Connection with 30-inch at Newton Street | . | . | . | 750 00 | |
| | | | | | | 78,700 00 |
| | | | | | | \$127,598 00 |
| Add 25 per cent. | | | | | | 31,899 50 |
| | | | | | | \$159,497 50 |
| Land damages, rights of way, etc. | | | | | | 15,000 00 |
| | | | | | | \$174,497 50 |

CAMBRIDGE WATER WORKS

DIAGRAM No 1

SHOWING METERED FLOW THROUGH PIPE
LINE FROM STONY BROOK TO FRESH POND

1903

A summary of Report of
Freeman, Coffin

... ..

Aug 20th

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Scale of Miles

347 5-2

1. 4

City of Cambridge
Massachusetts

ANNUAL REPORT

OF THE

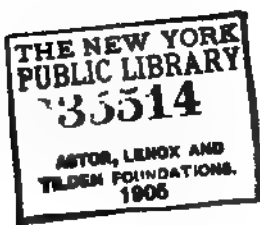


WATER BOARD

FOR THE

YEAR ENDING NOVEMBER 30, 1904

PRINTED FOR THE DEPARTMENT



CAMBRIDGE WATER BOARD

1905

President

WILLIAM B. DURANT

Members of the Board

JOSEPH H. HOWARD

Term expires 1905

WILLIAM B. DURANT

Term expires 1906

EDWARD E. BABY

Term expires 1907

JOHN E. GILLEN

Term expires 1908

EDMUND H. STEVENS

Term expires 1909

WALTER H. HARDING, Clerk

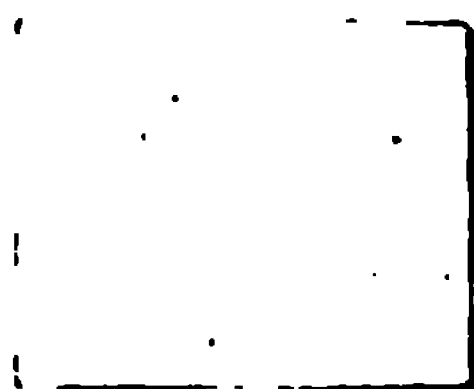
Superintendent of Works

EDWIN C. BROOKS

Water Registrar

WALTER H. HARDING.

CHESTER**JOHN SAE****A. K. P. V****ROBERT I****SAMUEL S****Z. L. RAY****HENRY L.****J. WARRE****GEORGE I****JOHN H.****KNOWLTO****JAMES M.****LEANDER****JOHN F. C****GEORGE I****E. BURT I****FRANK A.****STILLMAN****WELLINGTON FILLMORE . . . 1896-1903****EDMUND H. STEVENS . . . 1899- (Now****WILLIAM B. DURANT . . . 1899- (Now****ANDREW J. RADY . . . 1903- (Now****JOHN F. O'BRIEN . . . 1903- (Now****Presidents of the Board****J. WARREN MERRILL . . . 1865-1867****ERZA PARMENTER . . . 1867****JOHN SARGENT . . . 1867-1871****J. WARREN MERRILL . . . 1871-1873****CHESTER W. KINGSLEY . . . 1873-1876****GEORGE P. CARTER . . . 1876-1883****CHESTER W. KINGSLEY . . . 1883-1894****JAMES M. W. HALL . . . 1894-1899****WILLIAM B. DURANT . . . 1899-**



REPORT OF THE CAMBRIDGE WATER BOARD

CAMBRIDGE, December 15, 1904

to the Honorable the City Council of the City of Cambridge

The latest annual report of the Cambridge Water Board for the year ending November 30, 1904, is herewith submitted for your consideration.

The different reservoirs, and other works under the charge of the Board are substantially in the same condition that they were a year ago, save that a striking improvement has been made in the grounds about Fresh Pond, which will be considered separately in another part of this report.

The main supply pipe is still inadequate to supply the needs of the town, and, in spite of all the efforts of the Board, nothing has been done except the construction of a new pipe line, the City Council having failed to make the necessary appropriation.

The condition of the water supplied by Hobb Brook and Stony Brook Reservoirs is still of good quality, and the supply abundant in the summer but scanty at Fresh Pond, owing to the insufficiency of the present main pipe.

Claims for land damages have been settled except one, but there must be some further takings of land made at an early date, to protect against the water of Hobb Brook, at certain seasons when it may possibly become of danger. The probable expense of such takings will however not be great, and, if they are made during the coming year, will be no longer to the purity of the water.

FINANCIAL STATEMENT IN BRIEF

| | |
|--|----------------|
| The total cost of the Water Works to November 30, 1904 was | \$1,750,000.00 |
| There was expended during the year on construction account | \$1,000,000.00 |
| That the total cost to November 30, 1904 was | \$2,750,000.00 |

WATER BOND ACCOUNT.

| | |
|--|-----------------------|
| The whole amount of bonds outstanding is | \$3,350,000 00 |
| Deducting from this sum the present value of the Water Debt Sinking Fund, exclusive of the note of the City for \$200,000 . . | 1,218,686 74 |
| Leaves as the net Water Debt | <u>\$2,131,913 26</u> |
| For further details of the financial condition of the department, reference may be made to the statement of the Registrar appended to this report. From that statement it appears that the excess of expenditures over receipts during the past year is the sum of | <u>\$3,882 88</u> |
| The net Water Debt November 30, 1903, was | \$2,287,778 54 |
| " " " " " " 1904, " | <u>2,131,913 26</u> |
| Reduction of net debt during the year | \$155,865 28 |

The deficit of \$3,882.88 was caused by payment into the Sinking Fund of a larger amount than the ordinances require. Strict compliance with the ordinances would have given us a surplus of nearly \$5,000, instead of a deficit of \$3,882.88, as stated above.

The reduction of the net debt during the year exceeds the reduction during the year 1903 by the sum of \$679.80, although there was no expenditure during that year for the improvement of Fresh Pond, while in the year 1904 there has been expended for that purpose the sum of \$12,500, so that the net increase in reduction of the debt may be properly called \$13,179.80.

WATER BASINS.

Hobbs Brook and Stony Brook Reservoirs are both nearly full, in spite of the dryness of the season, which has caused a scarcity of water in many cities and towns in New England. Fresh Pond, owing to the purchase of water during the year from the Metropolitan Water and Sewerage Board, (which is now in use), is rapidly rising, and will probably soon be filled, or nearly filled, so that no scarcity of water need be apprehended during the Winter.

In April last it became apparent that something must be done to avert a water famine, and, no other means of increasing the supply being possible, the Board requested the Metropolitan Board to provide the City with a temporary supply of water. This request was granted, and between April 27th and June 4th, 330,000,000 gallons of water were purchased at a cost of \$15,218. In November, last, the Pond being nearly five feet below high water mark, the Board recommended that a further supply be purchased, and the Metropolitan Board again consented to come to the relief of the City, so that at this date, the water-takers are entirely



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1877-80: The water delivered directly into the street mains through a connection with the main at the High Level. No water is delivered to the principal supply reservoir. The water is delivered from the High Level, so that all the water is delivered through the street mains and is delivered to the High Level.

[illegible]

074 1118 1198

[illegible]

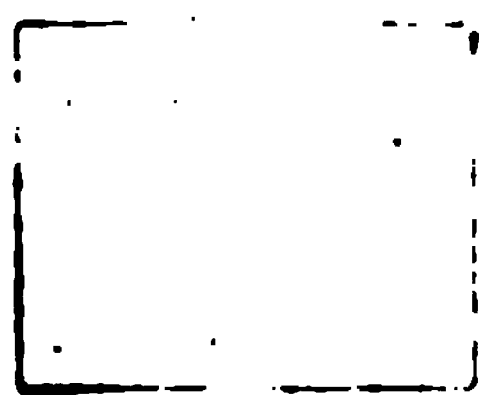
In the report of the Board for 1896 it was stated that by the year 1900 a new pipe would have to be laid, and such new pipe was advocated by the Board of the years 1898, 1899, 1900, 1902 and 1903.

The City Council of the year 1903 voted that the Mayor petition the Legislature for permission to issue bonds to the amount of \$500,000 for the purpose of constructing a new pipe line, and such petition was drawn up, signed by the Mayor, and presented to the Legislature early in the session of 1904. After due hearing before the Legislative Committee, to whom the petition was referred, the committee reported recommending that the petition be granted, and an Act authorizing the issue of bonds was passed February 16, 1904. See Chapter 90 of the Acts of the year 1904.

Very soon thereafter the Water Board requested the City Council to make an appropriation of \$500,000 for the purpose of beginning the construction of a new pipe line in three sections, one section from Hobbs Brook Reservoir to a point on the present pipe line passing through Newton Street in Waltham, another from Irving Street in Watertown to Fresh Pond, and another section from Irving Street to meet the section first named. This request was denied. The Committee on Water Supply subsequently recommended an appropriation of \$250,000 with which to construct the lower section from Irving Street to Fresh Pond; but although the entire Board of Aldermen voted in favor of the appropriation, with a majority of the Common Council concurring, the appropriation failed, because two-thirds of the Common Council did not concur with the Board of Aldermen, a two-thirds vote being necessary.

The lower section was to be constructed entirely of concrete, sixty-three inches in diameter, and, inasmuch as the summits above the hydraulic mean gradient, which greatly obstruct the flow of water in the present pipe, are all between Irving Street and Fresh Pond, this new section alone would have so increased the capacity of the pipe that it would have delivered water enough to meet all demands for at least four years to come.

The annual interest and sinking fund payments on the cost of this section would be \$13,750. As it is, the City has paid, including the cost of the water now being supplied, over \$30,000 for water from the Metropolitan Board, while it could have had water from our own sources at an expense of \$13,750. It is plainly evident, that the new pipe line



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The decrease is undoubtedly due to the smaller rain-fall this year, which is several inches less than the rain-fall of the year 1903, as appears by the following table.

The annual rain-fall for the past ten years at Fresh Pond is as follows : —

| | Inches. |
|-------------------|--------------|
| 1895 | 47.12 |
| 1896 | 38.82 |
| 1897 | 42.53 |
| 1898 | 52.42 |
| 1899 | 37.28 |
| 1900 | 46.89 |
| 1901 | 46.20 |
| 1902 | 43.31 |
| 1903 | 44.23 |
| 1904 | 42.89 |
| Average | <u>44.17</u> |

The rain-fall for the year at Hobbs Brook was 39.95 inches ; at Stony Brook, 41.18 inches.

The rain-fall for the year at Hobbs Brook was 39.95 inches, as compared with 47.42 inches in 1903, showing a loss of 7.47 inches. The rain-fall at Stony Brook was 41.18 inches, as compared with 45.97 inches in 1903, a loss of 4.79 inches.

The prediction of the Board, in the last annual report, that the year 1904 was likely to be a dry year has been fulfilled.

CONSUMPTION OF WATER.

| | |
|--|---------------------------|
| The total consumption of water for the year ending December 1, 1904, was | 3,210,982,145 gallons |
| For the year ending December 1, 1903 | 3,160,704,545 " |
| Excess of consumption this year | <u>50,277,600 gallons</u> |
| The excess of consumption for the year ending December 1, 1903, over the year ending December 1, 1902, was | 230,150,815 " |
| In 1894 the total consumption was | 2,127,878,627 gallons |
| The consumption of the year 1904 being | 3,210,982,145 " |
| and that of 1894 | <u>2,127,878,627 "</u> |
| In ten years the consumption has increased | 1,083,103,518 gallons |
| or about one-half. | |

The reduction in excess of consumption this year is undoubtedly due in part to the introduction of additional meters.

FIVE THIRTY

The action of the electric current liberated in the ground by the operation of the Electric Elevated Railway Company, the main pipes, has caused rapid deterioration, resulting in many instances in complete perforation of the pipe, thereby causing leaks which appeared at the surface of the ground.

[illegible]

WITNESSES:

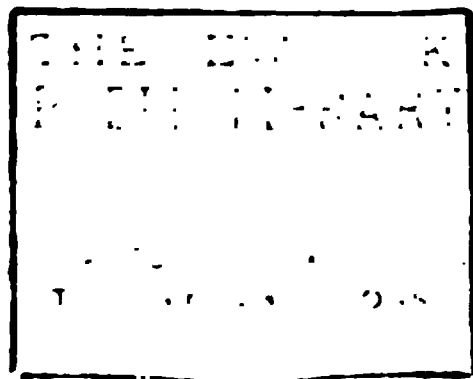
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supply pipes. Often there are pending many applications for meters which the Board is unable to grant for lack of sufficient appropriations. Such a state of things is far from satisfactory, and the Board recommends the City Council to give the matter careful consideration, and advise that the meter system be gradually extended, by granting meters to all who apply for them, even if the City Council should not be disposed to require that all consumers shall be supplied through meters. The Board believe that even with the small number of meters already set, a considerable reduction has taken place in the amount of water wasted, and that it would at all events be well for the City Council to consider once more the policy of gradually applying the meter system to all supplies.

Respectfully submitted,

WILLIAM B. DURANT,
GEORGE H. HOWARD,
EDMUND H. STEVENS,
ANDREW J. RADY,
JOHN F. O'BRIEN,

Cambridge Water Board.



REPORT OF ELECTRICAL ENGINEER

COMMUNIST, December 17, 1948

2. Die zweite in der Hand

In reply to your request for a statement of the clea
the Cambridge water pages, I would respectfully submit
the following report

I saw a large amount of damage being done to the pipes of your system by the street of the Boston Elevated Railway Company. That you may better understand the difficulty a description of the distribution of the water is necessary.

The Electric Railway Company has a power house on Haystack Street, near Market Square, from which several thousand horse power of electricity is generated. There are here located large engines and a main machine of developing current at a pressure of two hundred volts. The current is sent out to all parts of Cambridge and is being used for the trolley wires which are connected to numerous overhead wires, leaving the conductors. These wires and feeders are in turn connected to the trolley wires in and about Cambridge. The current flows through the motors of the cars, where its potential energy is largely converted into motion. The current flows to the rails and then back over the rails and through the connections to the power house. The rails are connected to ground by fish plates, which carry some of the current. The rails are connected to the trolley wires and the fish plates, and the trolley wires are connected together by a mass of cast iron rods, which are connected with the rails and trolley wires at every part of the system. There are also large copper wires connected to the rails and trolley wires, which are called ground wires, and are connected to the ground.

1. The resistance to the "m" of "m" is not a simple one. It is a complex one, involving the resistance to the "m" of "m" and the resistance to the "m" of "m".

path. The Boston Elevated Railway Company has *not* put in return wires as rapidly as they have increased the current flowing out to propel their cars.

The result of this negligence is increased action on the City pipes. It is a well recognized fact that all the current sent out must return to the dynamo; and it is also a well known electrical law that the path which this current will take will be a divided one, a part going by each path available, the relative amounts being inversely proportional to the resistance offered by the paths. The larger part will return by the rails and return wires and the lead covering of the cables, a lesser amount by the ground and pipes.

In those parts of the City where the current goes into the pipe there will be no action which injures them; but all current that flows from distant points back towards the power house must leave the pipes and go to the rails again. I find from a survey that for over a mile in all directions from the power house this condition of affairs, *i. e.*, a flow of electricity from pipes to rail, and in this entire section there is electrolytic action night and day in proportion to the number of cars running.

In Putnam Square where water pipes pass under the conduits some current leaves the pipes and takes to the lead sheaths of the cable.

I have known of sections of pipes or connections losing sixty per cent. of their weight from this cause in six months.

Recently the six-inch main on Boylston Street has developed holes from this cause.

The most serious trouble, however, this year, has been on Huron Avenue, near Sparks Street, where numerous holes described in your Superintendent's report have developed in the forty-inch steel main. This difficulty was discovered early in the Summer and I was enabled to conduct a series of experiments and make some careful measurements to which I referred in a communication sent to you in June, just before I sailed for Europe. This work was, however, nearly completed and I have had the benefit of the further work of Mr. Corning, an electrical engineer, connected with the Boston Elevated Railway Company, and of Mr. W. E. Foss of the Metropolitan Water Board, who concluded the experiments in July.

Before I went Mr. Corning and I agreed that a connection could be

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side between the main and the rail at Huron Avenue and Sparks Street as branch. During the summer this connection was established and the action largely reduced at this point. You should however understand that such a connection is not an unmixed blessing, for when rail and pipe are connected you have reduced the resistance and increased the amount of current flowing on the pipes, and in the event of the joints in the pipes forming poor electrical connection there is likely to be action on the pipes where the current leaves to flow through the ground to reach the other side of the joint.

In the forty-inch steel main I found the riveted joints of low resistance even the joints riveted in the trench, called "field joints" were of very low resistance, equaling less than a foot of plain pipe. This main was connected with the other pipes at many points and could be more easily handled than any other part of your system. It is a vital part of the water and should be preserved even at the sacrifice of connecting branches. It therefore seemed wise to place an insulating joint in each of these branches where it joins the forty-inch main. One was placed on the branch atushing Street and one at Reservoir Street and an immediate fall in the flow of current was noticed. We shall expect more action at the ends of each of these branches near Huron Avenue than we have had heretofore, but the damage to the City will be less than would be the case had we not installed these joints.

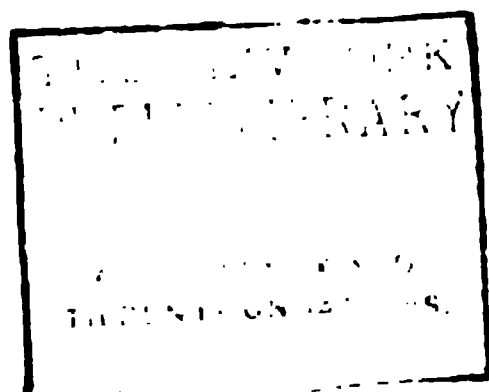
It is my opinion your Board has done all that it can do to protect the City. I am however of the opinion that the Boston Elevated Railway Company has been negligent in that it has not supplied sufficient return wires for its system. More of such wires would lessen the action on the pipes and a double trolley wire would completely eliminate the trouble.

Respectfully yours,

Signed,

CHAS. H. MORSE,

325 Harvard Street, Cambridge, Mass.



Electrolytic Investigation on 40-in. Steel Pipe

HURON AVENUE. CAMBRIDGE

May and June. 1904

INDEX

Electrolytic Investigation on 40-inch Steel Pipe, Huron Ave., Cambridge

TABLE.

NATURE OF TEST.

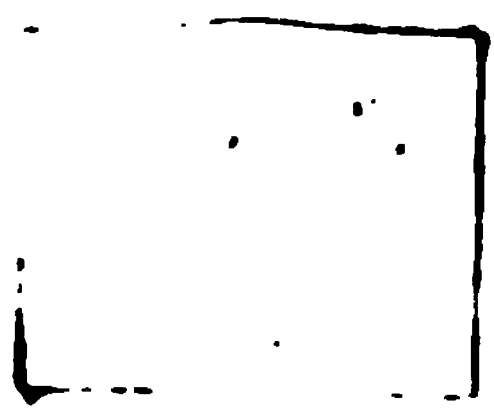
1. Measurement of resistance of 40-inch Steel Pipe at Cambridge Pipe Yard. May 26, 1904.
2. Comparison of joints in pipe at Excavation east of Appleton St. May 27, 1904.
3. Drop over 46½ feet of 40-inch pipe at Appleton St. Excavation and 50 feet at R. R. Bridge. May 28, 1904.
4. Drop over 92.8 feet of pipe east of Appleton St., with arrangements for Bonding. May 31, 1904.
5. Potential between pipe and rail. Pipe normal also bonded to rail. June 1, 1904.
6. Drop on branch pipes at Reservoir St., Park Ave. and Cushing St. June 1 and 3, 1904.
7. Potential between pipe and rail at Garden, Appleton and Fayerweather Sts., and R. R. Bridge. June 6, 1904.
8. Potential between pipe and rail at Garden, Appleton and Fayerweather Sts., and R. R. Bridge. Bond at Washington Elm. June 6, 1904.
9. Same as 7. June 6, 1904.
10. Same as 8. June 6, 1904.
11. Drop on pipes at Garden, Appleton and Cushing Sts., and Park Ave. Conditions, normal. June 6, 1904.
12. Same as 11, except Bonded at Washington Elm. June 6, 1904.
13. Drop on pipes at Appleton, Reservoir and Cushing Sts., and Park Ave. Normal conditions. June 6, 1904.
14. Same as 13, except Bonded at Appleton St. June 6, 1904.
15. Drop on 40-inch pipe at Cambridge Common. Pipe normal and Bonded at Washington Elm and Appleton St. June 8, 1904.
16. Comparison between drop over one section of 40-inch Steel Pipe 6.9 feet long and a length including 14 sections and 14 joints 92.6 feet long. June 9, 1904.

Table No. 5 showed that with a bond between pipe and rail of proper size and length at Appleton Street action at this point would be greatly reduced.

Table No. 6 tends to show that all the current on the 40-inch main at Appleton Street does not come from the branches at Reservoir Street, Park Avenue, and Cushing Street, but is from other sources.

Tables No. 7 and No. 8 tend to show that with bond at Garden Street, at Washington Elm, action would not be stopped at Appleton Street.

Table No. 15 shows that a bond at the Washington Elm brought a large flow of current of the Massachusetts Avenue lines, with no assurance of a corresponding decrease at the power house. That under normal condition, i. e., without bond, that a large current was flowing on to the Massachusetts Avenue pipes which would have to leave them again at the power house and cause trouble there. It also shows that a bond at Appleton Street would probably relieve both of these conditions.





Normal Current on Pipe --- C W W 40" Steel Pipe



Sketch showing Arrangement of Apparatus for
Battery Test to determine Amount of Electricity
Flowing on C.W.W 40" Steel Pipe, Huron Avenue,
Cambridge, Mass. May 31, 1904

TABLE 2. .
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

May 27, 1904.

Comparison of joints in pipe at excavation east of Appleton Street.
Readings taken over 7.05 feet of pipe including a joint.

Simultaneous readings over alternate joints.
First section 6½ feet east of a line opposite pole ½½.
M. V. M. No. 6789 and M. V. M. No. 14449.
Readings in divisions. 1 division =.2 M. V.

| | | | |
|--------------------|----------|---|----------------------|
| Joint 3 | Joint 1 | Joint 16 | Joint 14 |
| 1.3 | 1.3 | Transposed Meters. | |
| 1.3 | 1.4 | 1.80 | 1.60 |
| Joint 4 | Joint 2 | 1.15 | 1.00 |
| 1.1 | 1.5 | 1.10 | 1.10 |
| .9 | 1.1 | 1.50 | 1.50 |
| .9 | 1.1 | Joint 17 | Joint 15 |
| 1.0 | 1.3 | 1.20 | 1.00 |
| Joint 7 | Joint 5 | 1.75 | 1.40 |
| 1.5 | 1.95 | 1.20 | 1.20 |
| 1.6 | 1.00 | 1.10 | 1.10 |
| 1.7 | 1.80 | Joint 20 | Joint 18 Field joint |
| 1.1 | 1.10 | 1.20 | 1.10 |
| Joint 8 | Joint 6 | 1.00 | .90 |
| 1.3 | 1.75 | .90 | .70 |
| 1.2 | 1.70 | 1.50 | 1.30 |
| 1.9 | 2.20 | Joint 21 | Joint 19 |
| 1.6 | 2.10 | 1.20 | 1.30 |
| Joint 11 | Joint 9 | 2.20 | 2.20 |
| 1.6 | 2.0 | 2.20 | 2.20 |
| 1.6 | 1.9 | Joint 24 | Joint 22 |
| 2.0 | 2.0 | 2.0 | 1.90 |
| 1.6 | 1.6 | 1.3 | 1.50 |
| 2.1 | 2.0 | 1.2 | 1.10 |
| Joint 12 | Joint 10 | 1.8 | 1.40 |
| 2.10 | 2.25 | Comparison of two sections of 7 joints each | |
| 2.10 | 2.30 | Meters with long leads checked. | |
| 2.20 | 2.40 | Includes | Includes |
| Joint 15 | Joint 13 | 2 field joints. | 1 field joint |
| 1.30 | 1.80 | { 6.0 | { 7.0 |
| 1.60 | 1.90 | { 9.5 | { 10.0 |
| 1.50 | 1.70 | { 5.4 | { 6.0 |
| 2.00 | 2.00 | { 8.6 | { 9.0 |
| Transposed Meters. | | Moved along one pipe length. | |
| 2.05 | 2.00 | 7.0 | 7.0 |
| 1.85 | 1.40 | 12.4 | 12.0 |
| 1.30 | 1.10 | 8.8 | 8.5 |
| | | 9.4 | 10.0 |
| | | East of Appleton St. | West of Appleton St. |
| | | 11.3 | 12.0 |
| | | 13.0 | 13.0 |
| | | 14.0 | 14.0 |
| | | 8.8 | 9.0 |
| | | 12.0 | 12.0 |

*These readings supposed not good on account of bad contact.

2

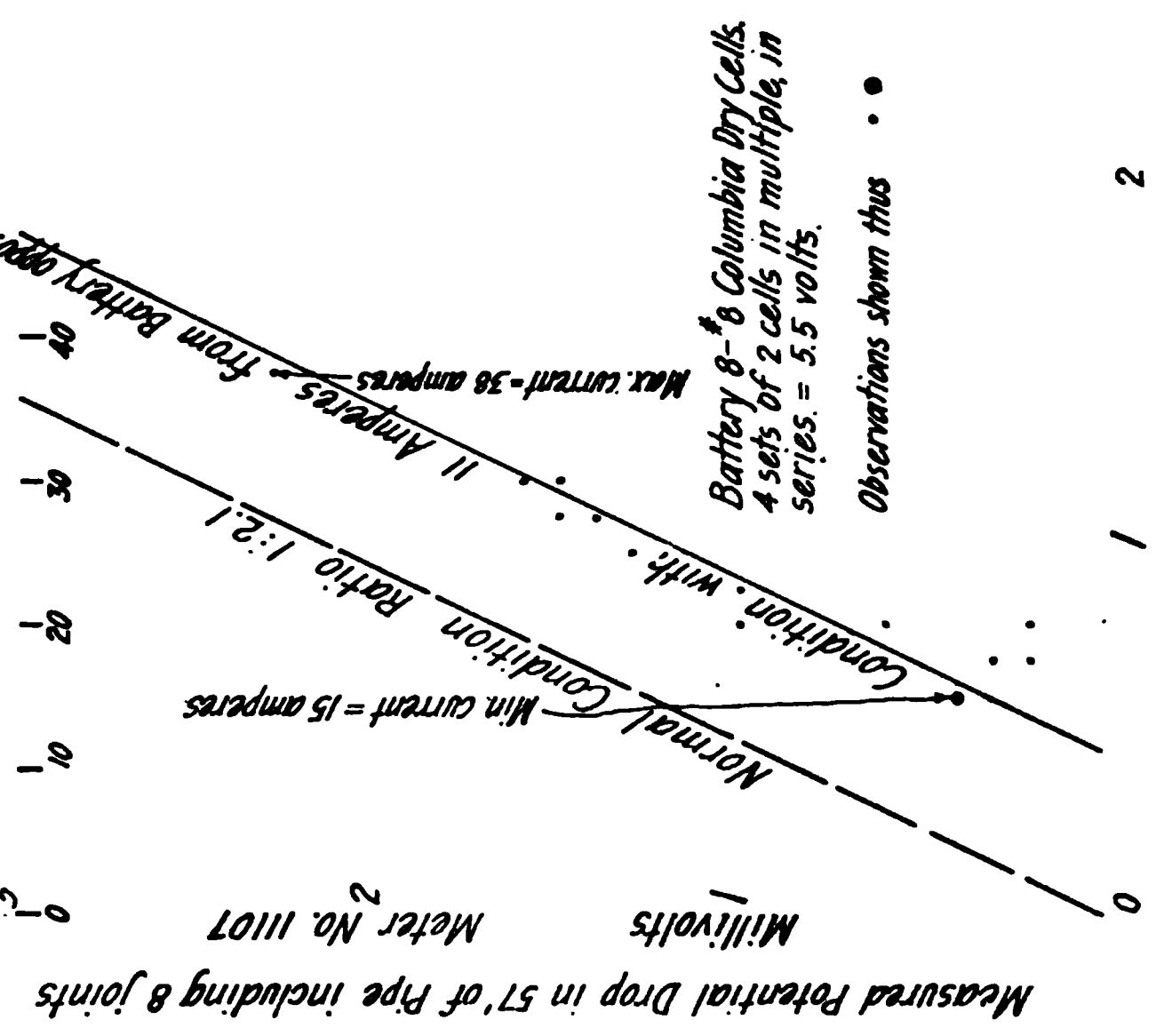
3

4

5

6

Battery test to determine amount of electricity flowing on C.W.W. 40" Steel Pipe, Huron Ave. Cambridge, Mass. May 27, 1904.
W.E. FOSS, CIV. ENGR., MET. W. W. JUNE 16, 1904.
Scale for Deduced Current on Pipe in Amperes



Battery 8-8 Columbia Dry Cells.
4 sets of 2 cells in multiple, in series = 5.5 volts.
Observations shown thus • •

Ratio of Gaging Stations.
(normal condition, no battery)

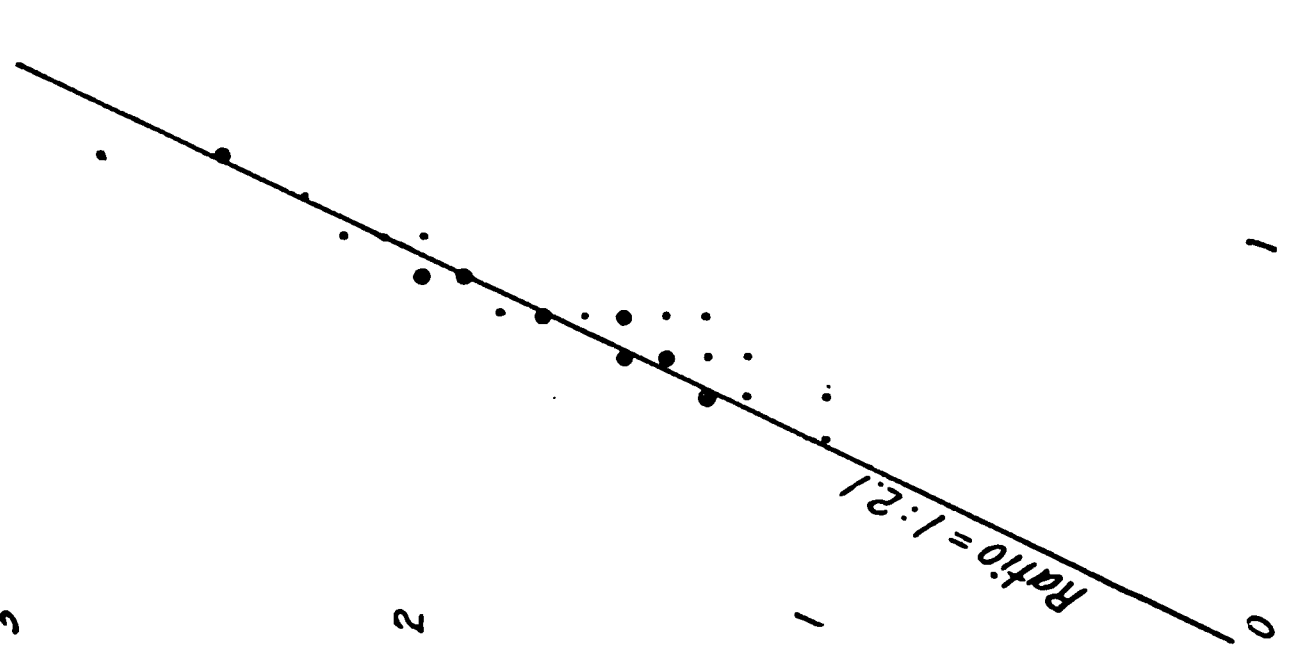


Table 3

**LD TREATMENT INVESTIGATION ON 60 INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.**

May 24, 1944

17 5 - 6 inch Pipe taken over 40' feet at Appleton Street

Photo taken 20 feet at Railroad Bridge

W. V. V. V. 6749 at Appleton Street

W 1 M 1 18889 at National Bridge

11 15 L. 11 25 L. M

[illegible]

DESTRUCTION OF MOUNTAIN IN FIRE AT
EL PASO, TEXAS, MOUNTAIN OF AFFECTION
OF THE

45 50 55 60

| THE HOUSE OF COMMONS | CHAMBER OF DEPUTIES |
|----------------------|---------------------|
| 18 | 18 |
| 19 | 19 |
| 20 | 20 |
| 21 | 21 |
| 22 | 22 |
| 23 | 23 |
| 24 | 24 |
| 25 | 25 |
| 26 | 26 |
| 27 | 27 |
| 28 | 28 |
| 29 | 29 |
| 30 | 30 |
| 31 | 31 |
| 32 | 32 |
| 33 | 33 |
| 34 | 34 |
| 35 | 35 |
| 36 | 36 |
| 37 | 37 |
| 38 | 38 |
| 39 | 39 |
| 40 | 40 |
| 41 | 41 |
| 42 | 42 |
| 43 | 43 |
| 44 | 44 |
| 45 | 45 |
| 46 | 46 |
| 47 | 47 |
| 48 | 48 |
| 49 | 49 |
| 50 | 50 |
| 51 | 51 |
| 52 | 52 |
| 53 | 53 |
| 54 | 54 |
| 55 | 55 |
| 56 | 56 |
| 57 | 57 |
| 58 | 58 |
| 59 | 59 |
| 60 | 60 |
| 61 | 61 |
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| 63 | 63 |
| 64 | 64 |
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| 83 | 83 |
| 84 | 84 |
| 85 | 85 |
| 86 | 86 |
| 87 | 87 |
| 88 | 88 |
| 89 | 89 |
| 90 | 90 |
| 91 | 91 |
| 92 | 92 |
| 93 | 93 |
| 94 | 94 |
| 95 | 95 |
| 96 | 96 |
| 97 | 97 |
| 98 | 98 |
| 99 | 99 |
| 100 | 100 |

COMBINATION OF FIRE WITH JOINT
AND WITHOUT JOINT AT PERMA
TION WEST OF AFFRITION
THREAT

10-11-1964

WM 2 Dec 79 p 60-61

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

1994 : 10

TABLE 4.
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.
May 31, 1904.

Readings of drop taken over 92.8 feet of pipe in excavation east of Appleton Street. Arrangements for connections between track and pipe at the following locations: 120 feet east of Appleton Street, called "East Bond;" 10 feet west of Appleton Street, called "Middle Bond;" and a few feet west of Fayerweather Street, called "West Bond."

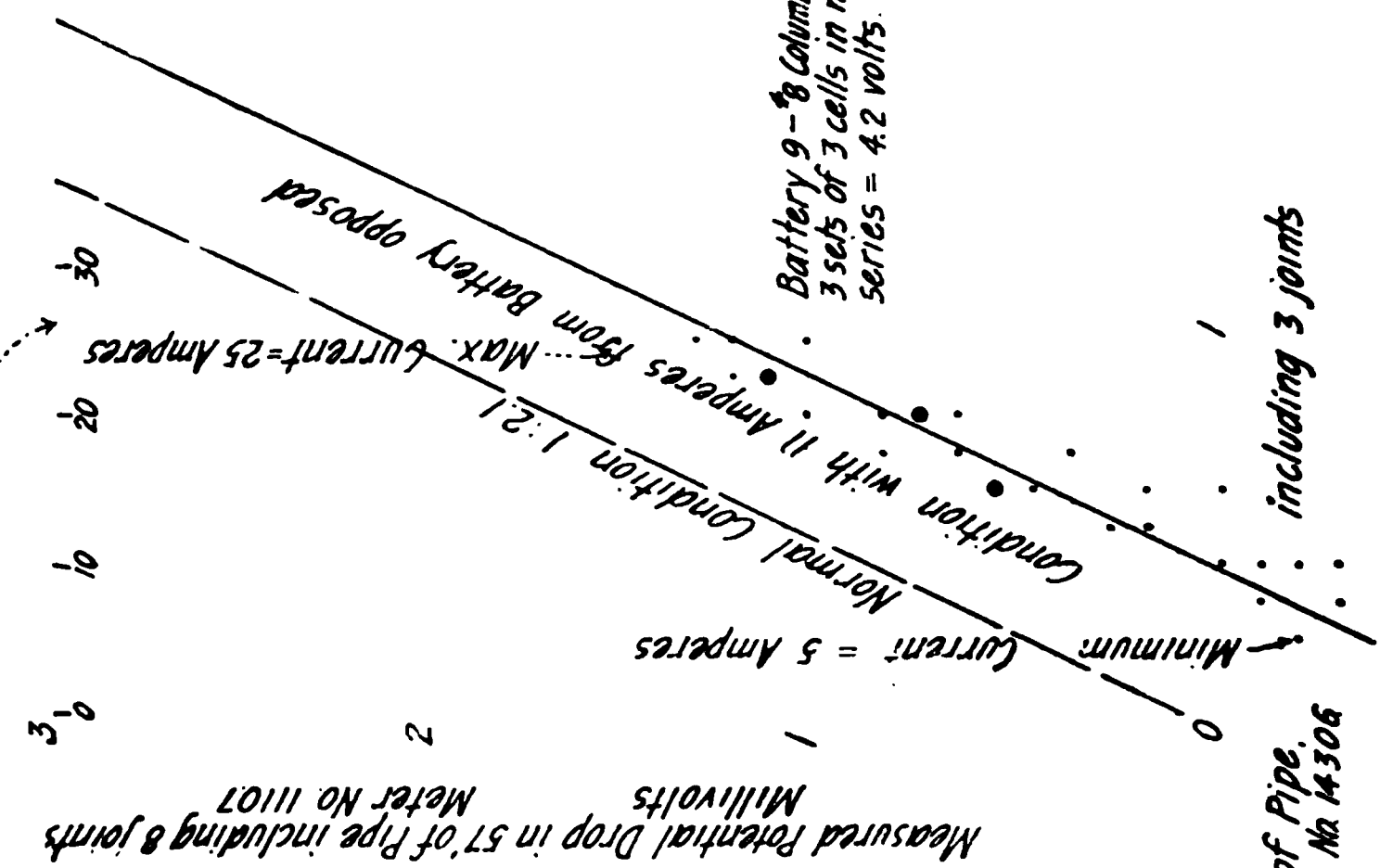
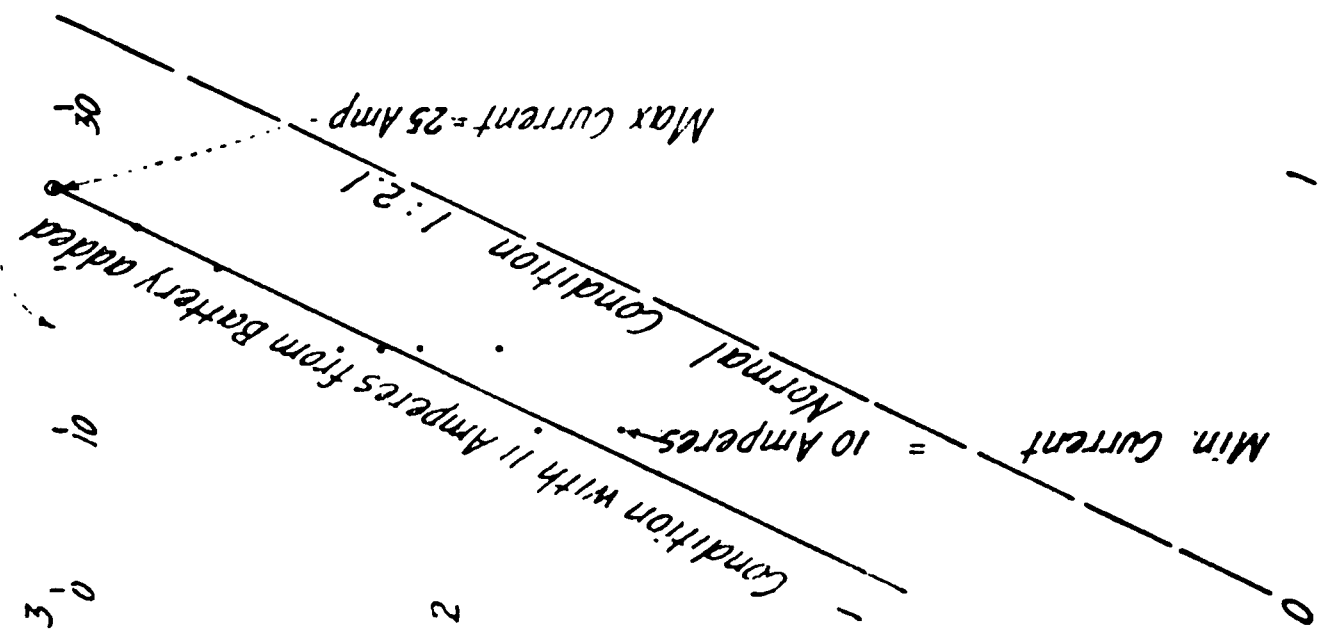
M. V. M. No. 14449. Current flowing east = + readings.

| Normal Conditions. | | East Bond Connected. | | West Bond Connected. | | Middle Bond Connected. | East & Middle Bonds Connected. | | East & West Bonds Connected. | | East, Middle & West Bonds Connected. | | Middle & West Bonds Connected. |
|--------------------|-----------|----------------------|-----------|----------------------|-----------|------------------------|--------------------------------|-----------|------------------------------|-----------|--------------------------------------|-----------|--------------------------------|
| 2.47 P.M. | 3.23 P.M. | 2.49 P.M. | 4.00 P.M. | 3.20 P.M. | 3.24 P.M. | 2.53 P.M. | 2.51 P.M. | 3.40 P.M. | 3.26 P.M. | 3.57 P.M. | 3.37 P.M. | 3.55 P.M. | 3.43 P.M. |
| M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. | M.V. |
| 2.20 | 1.80 | 4.00 | 6.00 | 1.80 | 2.00 | -1.20 | 3.00 | 5.20 | 6.00 | 5.00 | 6.80 | 9.20 | -1.80 |
| 2.20 | 1.80 | 4.00 | 6.00 | 1.80 | 1.60 | -1.60 | 2.20 | 4.40 | 7.20 | 6.20 | 8.40 | 5.10 | -2.40 |
| 2.20 | 1.60 | 3.85 | 5.40 | 2.00 | .0 | -1.60 | 3.00 | 4.00 | 6.60 | 10.00 | 6.20 | 6.00 | -1.20 |
| 3.00 | .80 | 4.20 | 5.60 | 2.40 | 3.00 | -1.00 | 1.80 | 4.20 | 7.80 | 11.00 | 7.40 | 8.00 | .40 |
| 2.30 | 1.60 | 4.40 | 4.20 | .80 | 2.60 | 1.20 | .60 | 4.20 | 6.60 | 11.00 | 7.60 | 10.00 | -2.00 |
| 3.20 | 2.00 | 3.90 | 4.40 | 4.00 | 2.40 | -1.30 | 1.80 | 4.80 | 5.00 | 9.00 | 6.40 | 8.00 | -.60 |
| 2.60 | 2.00 | 3.40 | 5.20 | 5.00 | 2.00 | -.60 | 3.00 | 3.30 | 5.00 | 6.00 | 6.20 | 6.40 | -1.00 |
| 2.40 | 3.00 | 4.70 | 6.00 | 2.40 | 2.00 | -1.30 | 2.80 | 2.80 | 7.80 | 7.20 | 6.50 | 7.00 | -3.00 |
| 1.80 | 1.80 | 4.30 | 5.80 | -.40 | -.40 | .0 | 2.60 | 3.00 | 9.00 | 4.60 | 7.00 | 6.20 | -2.00 |
| 1.70 | 1.60 | 4.60 | 5.40 | .20 | -.80 | -1.00 | 3.40 | 2.80 | 7.80 | 6.40 | 4.60 | 6.00 | -1.20 |
| 2.00 | 2.20 | 4.40 | 5.60 | 1.40 | 2.00 | -.40 | 3.80 | 4.00 | 6.80 | 8.80 | 6.20 | 5.80 | .20 |
| 1.60 | 3.00 | 5.10 | 5.00 | .40 | 2.40 | -1.00 | 3.80 | 4.40 | 8.80 | 6.40 | 9.60 | 5.60 | .0 |
| 2.90 | 3.10 | 4.20 | 5.40 | 4.00 | 3.00 | -2.40 | 4.60 | 4.40 | 6.60 | 8.40 | 6.80 | 4.20 | -.20 |
| 2.40 | 2.60 | 3.80 | 4.80 | 1.20 | 2.60 | -1.90 | 3.00 | 4.60 | 5.10 | 9.20 | 7.40 | 8.20 | -2.00 |
| 2.40 | 3.00 | 1.40 | 4.60 | .20 | 1.80 | -1.80 | 2.10 | 4.00 | 3.80 | 9.40 | 6.00 | 10.40 | .80 |
| 3.20 | 1.80 | 4.00 | 5.00 | 1.80 | .80 | -1.20 | 3.80 | 3.80 | 4.90 | 10.20 | 6.50 | 6.60 | -2.60 |
| 4.00 | 2.70 | 4.40 | 5.20 | 1.80 | 1.10 | -1.60 | 4.00 | 2.40 | 5.00 | 9.40 | 6.20 | 6.60 | -1.60 |
| 3.80 | 2.40 | 4.20 | 4.20 | .50 | .70 | -2.00 | 3.00 | 4.00 | 4.40 | 8.00 | 9.00 | 5.80 | -1.20 |
| 2.30 | 2.00 | 4.60 | 4.40 | 2.20 | 3.30 | 2.00 | 4.20 | 4.60 | 5.40 | 9.20 | 7.00 | 7.00 | -.80 |
| 2.40 | 2.60 | 4.80 | 6.00 | .80 | 2.00 | .80 | 1.40 | 4.00 | 6.00 | 7.20 | 7.40 | 7.20 | -.80 |
| 2.60 | 2.60 | 4.60 | 6.20 | 3.60 | 2.80 | -.60 | 4.40 | 4.40 | 6.70 | 6.00 | 7.20 | 5.00 | .0 |
| 2.80 | 3.60 | 4.20 | 5.80 | 1.20 | 2.60 | .0 | 3.80 | 4.00 | 4.60 | 11.00 | 5.80 | 6.00 | .80 |
| 3.10 | 3.20 | 4.60 | .... | 1.60 | .... | .0 | 3.00 | .... | 7.60 | .... | 8.00 | .... | ..... |
| 1.80 | .... | 5.10 | .... | 1.00 | .... | -1.00 | 3.20 | .... | 8.00 | .... | .... | .... | ..... |
| .... | .... | .... | .... | 2.00 | .... | .... | .... | .... | .... | .... | .... | .... | ..... |
| Ave. 2.54 | 2.27 | 4.33 | 5.27 | 1.75 | 1.79 | -.81 | 3.01 | 3.97 | 6.35 | 8.16 | 7.01 | 6.83 | -0.4 |
| 2.41 | | 4.80 | | 1.77 | | | 3.49 | | 7.26 | | 6.92 | | |
| Approx. Amps. 21.0 | | 41.7 | | 15.4 | | -7.0 | 30.2 | | 63.2 | | 60.2 | | -8.2 |
| 1.17 | | 1.17 | | 1.17 | | 1.17 | 1.17 | | 1.17 | | 1.17 | | 1.17 |
| 17.9 Amps. | | 35.6 Amps. | | 13.1 Amps. | | -6.0 Aps | 25.8 Amps. | | 54.0 Amps. | | 31.5 Amps. | | -7.0 Aps |

1]

Battery test to determine amount of electricity flowing on C.W.W. 40" Steel Pipe Huron Ave. Cambridge Mass. May 31, 1904.
 W.E. POSS. CIV. ENGR., DET. N.Y. JUNE 14, 1904

Scale for Deduced Current on Pipe in Amperes



Battery 9-8 Columbia Dry Cells
 3 sets of 3 cells in multiple. in
 series = 4.2 volts.

Measured Potential Drop in 24' of Pipe, Meter No 14306
 including 3 joints

TABLE 6.

ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

Drop on branch pipes at Reservoir Street, Park Avenue and Cushing Street.

In each case current flows towards 40-inch steel main.

| | | RESERVOIR ST. | | PARK AVE. | | CUSHING St. | |
|---|-------------------------------|--|-------------------------------|--|-------------------------------|---|-------------------------------|
| Drop over 92.8 feet of 40-inch steel main near Appleton St. M. V. M. No. 14449. June 1, 1904. | | Drop over 9.8 feet of 20-inch cast iron pipe. M. V. M. No. 6789. June 1, 1904. | | Drop over 5 feet, 9 inches of 6-inch cast iron pipe. M. V. M. No. 14449. June 8, 1904. | | Drop over 5 feet, 10 inches of 12-inch cast iron pipe. M. V. M. No. 6789. June 8, 1904. | |
| Normal Condition | With bond at Appleton Street. | Normal Condition. | With bond at Appleton Street. | Normal Condition. | With bond at Appleton Street. | Normal Condition. | With bond at Appleton Street. |
| 3.0 | 5.6 | .6 | .8 | 1.50 1.60 | 2.40 2.20 | .20 .30 | .10 .45 |
| 3.4 | 5.8 | .9 | .7 | 1.40 1.95 | 2.70 2.60 | .20 .40 | .10 .45 |
| 2.6 | 5.2 | .7 | .8 | 1.55 1.50 | 2.60 2.95 | .25 .40 | .20 .40 |
| 2.2 | 5.0 | .6 | 1.0 | 1.70 1.20 | 2.00 2.80 | .30 .35 | .40 .35 |
| 2.6 | 5.2 | .8 | 1.0 | 1.70 1.10 | 2.50 2.65 | .30 .40 | .45 .35 |
| 2.6 | 6.0 | .9 | .9 | 1.40 1.90 | 2.40 2.70 | .35 .40 | .25 .30 |
| 2.5 | 5.8 | .7 | .9 | 1.40 1.60 | 2.50 2.45 | .30 .35 | .10 .25 |
| 4.0 | 6.2 | .8 | .8 | 1.80 1.80 | 3.00 2.30 | .29 .35 | .30 .40 |
| 3.2 | 4.8 | .7 | .8 | 1.85 1.85 | 2.80 2.00 | .25 .35 | .40 .35 |
| 2.8 | 5.2 | .6 | .7 | 1.60 1.80 | 2.50 2.10 | .20 .30 | .40 .20 |
| 2.1 | 5.8 | .5 | .9 | 1.60 1.25 | 2.20 2.50 | .25 .35 | .45 .15 |
| 3.0 | 6.0 | .6 | 1.0 | 1.10 1.40 | 2.50 2.40 | .25 .35 | .40 .30 |
| 3.6 | 4.8 | .7 | .8 | 1.25 1.95 | 3.00 2.35 | .22 .40 | .40 .35 |
| 4.0 | 5.0 | .6 | .8 | 1.60 2.00 | 3.00 1.90 | .30 .45 | .25 .40 |
| 3.2 | 5.0 | .7 | .7 | 1.40 1.85 | 3.00 1.80 | .30 .45 | .20 .35 |
| 3.4 | 4.2 | .6 | .8 | 1.35 1.95 | 2.60 2.15 | .30 .40 | .25 .40 |
| 2.8 | 4.6 | .5 | .6 | 1.50 1.70 | 2.70 2.20 | .25 .40 | .10 .35 |
| 3.0 | 4.6 | .7 | .8 | 1.60 2.00 | 2.05 2.20 | .30 .40 | .40 .30 |
| 3.6 | 4.8 | .7 | .8 | 1.10 1.90 | 1.95 2.30 | .30 .40 | .40 .25 |
| 3.6 | 4.2 | .8 | .9 | 1.10 2.10 | 2.00 2.45 | .20 .40 | .40 .35 |
| 2.8 | 4.8 | 1.0 | .9 | 1.40 1.95 | 2.10 1.85 | .20 .30 | .40 .30 |
| 2.2 | 5.2 | .8 | .8 | 1.70 2.10 | 2.40 1.80 | .15 .25 | .45 .25 |
| 2.0 | 5.6 | .7 | .7 | 2.00 1.90 | 2.50 2.40 | .25 .40 | .50 .35 |
| 3.4 | 5.8 | .7 | .6 | 1.55 2.00 | 2.30 1.70 | .25 .40 | .45 .25 |
| | 6.6 | .8 | .8 | 1.80 2.00 | 2.30 1.80 | .25 .30 | .50 .25 |
| Ave.=2.98 | 5.8 | .6 | .7 | 2.20 2.30 | 2.30 2.30 | .15 .35 | .40 .30 |
| 22.1Amps. | 5.4 | | | 1.90 1.60 | 2.90 1.90 | .20 .35 | .40 .30 |
| | Ave.=5.30 | Ave.= | Ave.=.81 | 1.80 1.85 | 2.80 2.10 | .25 .35 | .45 .30 |
| | | 11.3 | 13.0 | 1.85 2.00 | 2.85 2.40 | .20 .40 | .45 .40 |
| | 39.2Amps. | Amps. | Amps | 1.40 1.60 | 2.40 | .20 .45 | .50 .25 |
| | | | | Ave.=1.683 | Ave.=2.40 | Ave.=.311 | Ave.=.335 |
| | | | | 7.7 Amps. | 11.0 Amps. | 3.6 Amps. | 3.65 Amps. |

TABLE 8.
ELECTROLYTIC INVESTIGATION OF 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

June 6, 1904.

Readings taken from 2.10 to 2.15 P. M. of Potential Differences
between Pipe and Rail at Garden, Appleton and Fayerweather Streets
and Railroad Bridge.

Track bonded to Pipe at Washington Elm.

| Garden Street
at Washington Elm. | Huron Avenue
at Appleton Street. | Huron Avenue
at Fayerweather Street. | Huron Avenue
at Railroad Bridge. |
|-------------------------------------|-------------------------------------|---|-------------------------------------|
| Pipe +
V. M. No. 8072. | Pipe —
V. M. No. 9531. | Pipe —
V. M. No. 9725. | Pipe —
V. M. No. 8821. |
| .11 Volts. | .75 Volts. | 1.80 Volts. | 1.95 Volts. |
| .11 | .55 | 1.15 | 1.45 |
| .12 | .60 | .80 | 1.10 |
| .12 | .50 | .65 | .95 |
| .13 | .45 | .80 | .90 |
| .12 | .50 | .90 | 1.25 |
| .10 | .45 | 1.40 | 1.75 |
| .12 | .50 | .65 | 1.60 |
| .12 | .98 | .80 | 1.00 |
| .14 | .95 | .90 | 1.10 |
| .13 | .50 | 1.15 | 1.45 |
| .13 | .40 | 1.80 | 1.50 |
| .12 | .70 | .70 | 1.05 |
| .13 | .78 | .45 | .80 |
| .11 | .25 | 1.05 | .95 |
| .11 | .30 | .60 | 1.80 |
| .13 | .78 | .95 | 1.15 |
| .14 | .25 | .85 | 1.00 |
| .13 | .15 | .70 | 1.70 |
| .14 | .75 | .50 | 1.20 |
| .11 | .95 | .95 | .75 |
| .12 | .45 | .80 | .75 |
| .13 | .65 | .95 | .70 |
| .12 | .50 | .75 | 1.05 |
| .13 | .68 | .15 | 1.85 |
| .14 | .45 | .50 | .75 |
| .14 | .25 | 1.10 | .80 |
| .12 | .25 | .75 | 1.45 |
| .12 | .80 | 1.80 | 1.50 |
| .13 | .65 | 1.20 | .90 |
| Ave. .12* | .54 | .86 | 1.15 |

* NOTE.—Low readings supposed to be caused by poor contact.

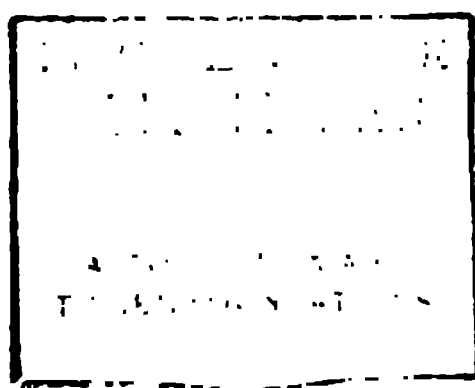


TABLE 10.
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

June 6, 1904.

Readings taken from 2.30 to 2.35 P. M. of Potential Differences
between Pipe and Rail at Garden, Appleton and Fayerweather Streets
and Railroad Bridge.

Track bonded to Pipe at Washington Elm.

| Garden Street
at Washington Elm. | Huron Avenue
at Appleton Street. | Huron Avenue
at Fayerweather Street. | Huron Avenue
at Railroad Bridge. |
|-------------------------------------|-------------------------------------|---|-------------------------------------|
| Pipe +
V. M. No. 8072. | Pipe —
V. M. No. 9531. | Pipe —
V. M. No. 9725. | Pipe —
V. M. No. 3921. |
| .50 Volts. | .50 Volts. | .60 Volts. | 1.15 Volts. |
| .40 | .48 | .45 | 1.05 |
| .45 | .30 | .65 | 1.15 |
| .30 | .28 | .55 | 1.25 |
| .35 | .30 | .80 | 1.50 |
| .35 | .35 | .75 | 1.25 |
| .50 | .30 | .65 | 1.45 |
| .60 | .32 | .70 | 1.75 |
| .55 | .33 | 1.05 | 1.60 |
| .40 | .75 | 1.50 | 1.80 |
| .55 | .50 | 1.25 | 1.50 |
| .45 | .45 | .95 | 1.60 |
| .60 | .70 | .45 | 1.00 |
| .55 | .65 | .30 | 1.05 |
| .40 | .15 | .55 | 1.20 |
| .60 | .45 | .70 | .95 |
| .40 | .35 | .80 | 1.25 |
| .50 | .25 | .15 | 1.25 |
| .55 | .05 | .90 | 1.50 |
| .45 | .55 | 1.00 | .85 |
| .55 | .45 | .85 | .90 |
| .45 | .35 | .65 | .95 |
| .40 | .45 | .85 | .35 |
| .45 | — .00 | — Ave. .74 | 1.00 |
| .40 | .25 | — .10 | .60 |
| .50 | .50 | .75 | .50 |
| .55 | — .05 | .15 | .00 |
| .50 | .40 | .75 | .15 |
| .45 | — .00 | — .10 | .35 |
| .50 | — .00 | — .15 | .05 |
| — | — | — .40 | — |
| Ave. .47 | .35 | | 1.04 |

TABULAR

HYDROSTATIC INVESTIGATION ON 40 INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE

June 6, 1904

Readings taken between 3.15 and 3.20 p.m. at Garden and Mason
Streets, Arlington Street and Huron Avenue, Park Avenue and Huron
Avenue and Cushing Street and Huron Avenue under normal conditions.

Garden and Mason Streets. Drop taken over 150 feet of 40 inch
steel pipe.

Arlington Street and Huron Avenue. Drop taken over 6 feet, 8
inches of 40 inch steel pipe.

Park Avenue and Huron Avenue. Drop taken over 5 feet, 10 inches
of 40 inch cast iron pipe.

Cushing Street and Huron Avenue. Drop taken over 5 feet, 10
inches of 42 inch cast iron pipe.

| | | | |
|----------------------|----------------------|------------------------------------|------------------------------------|
| Garden and Mason | Arlington and Huron | Park and Huron | Cushing and Huron. |
| current flowing east | current flowing east | current flowing towards
the sea | current flowing towards
the sea |
| W. 1. 11. 50. 00 | W. 1. 11. 50. 00 | East No. 1. 11. 50. 00 | W. 1. 11. 50. 00 |

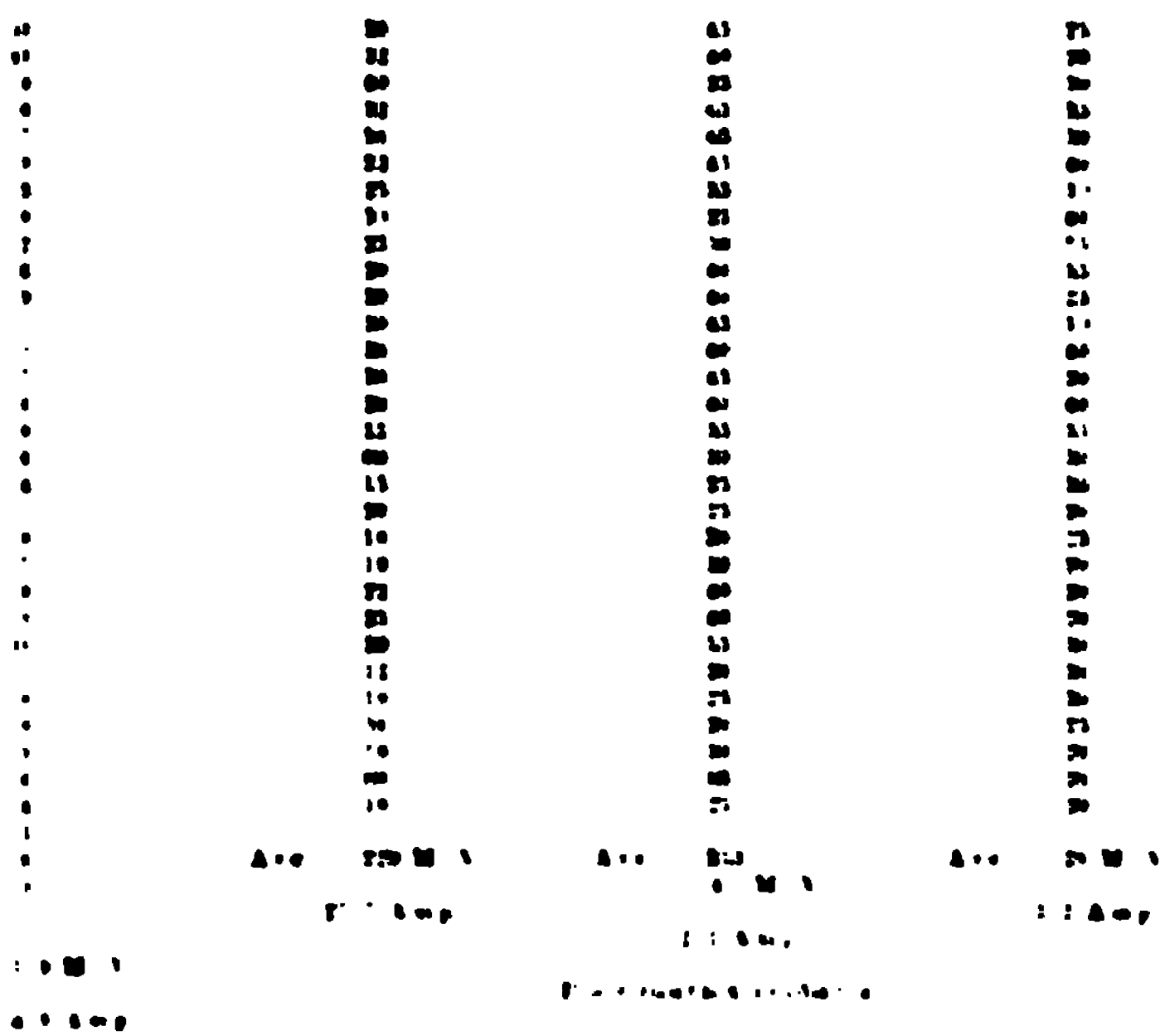


TABLE 12.
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

June 6, 1904.

Readings taken between 3.25 and 3.30 p. m. at Garden and Mason Streets, Appleton Street and Huron Avenue, Park Avenue and Huron Avenue, and Cushing Street and Huron Avenue.

Garden and Sparks Streets. Drop taken over 180 feet of 40-inch steel pipe:

Appleton Street and Huron Avenue. Drop taken over 6 feet, 8 inches of 40-inch steel pipe.

Park Avenue and Huron Avenue. Drop taken over 5 feet, 10 inches of 6-inch cast iron pipe.

Cushing Street and Huron Avenue. Drop taken over 5 feet, 10 inches of 12-inch cast iron pipe.

Bond between pipe and rail at Garden and Mason Streets.

| GARDEN AND MASON.
Current flowing east.
M. V. M. No. 679. | APPLETON AND HURON.
Current flowing east.
M. V. M. No. 14449. | PARK AND HURON.
Current flowing
towards steel main.
Inst. No. 4116. | CUSHING AND HURON.
Current flowing
towards steel main.
M. V. M. No. 6789. |
|---|---|--|--|
| 25. | .85 | .45 | .45 |
| 26. | .15 | .30 | .45 |
| 15. | .18 | .40 | .30 |
| 27. | .40 | .55 | .30 |
| 27. | .40 | .45 | .35 |
| 25. | .42 | .70 | .35 |
| 15. | .45 | .65 | .40 |
| 18. | .40 | .60 | .45 |
| 14. | .45 | .50 | .40 |
| 14. | .45 | .60 | .45 |
| 17. | .45 | .45 | .30 |
| 21. | .30 | .45 | .40 |
| 20. | .32 | .55 | .40 |
| 15. | .35 | .80 | .30 |
| 13. | .40 | .55 | .35 |
| 18. | .40 | .55 | .45 |
| 15. | .38 | .65 | .45 |
| 20. | .40 | .45 | .35 |
| 18. | .45 | .50 | .40 |
| 23. | .42 | .45 | .45 |
| 19. | .40 | .65 | .35 |
| 21. | .35 | .50 | .45 |
| 20. | .40 | .40 | .30 |
| 22. | .40 | .35 | .30 |
| 27. | .38 | .40 | .45 |
| 28. | .30 | .40 | .40 |
| 27. | .40 | .30 | .40 |
| 24. | .45 | .25 | .40 |
| 24. | .35 | .20 | .40 |
| 26. | .25 | .25 | .40 |
| 23. | | | |
| 18. | Ave.=.372 M. V. | Ave.=.477 | Ave.=.387 M. V. |
| 25. | | | |
| 29. | 45.1 Amp. | .61 M. V. | 4.5 Amp. |
| 30. | | | |
| 28. | | 2.6 Amp. | |
| 25. | | | |
| 20. | | Low reading supposed
to be caused by poor
contact. | |
| 21. | | | |
| Ave.=21.6
=10.8 M. V. | | | |
| 41.4 Amp. | | | |

TABLE 13

**ELECTROLYTIC INVESTIGATION ON 40 INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE**

June 6, 1944

Readings taken between 4:00 and 4:05 p.m. at Appleton Street,
Lowell Street, Park Avenue and Cushing Street on Huron Avenue

Op. sec. street Drop taken over 6 feet, 7 inches of 40 inch steel

House: Street Drop taken over 9 feet, 8 inches of 24-inch cast

First Avenue Drop taken over 3 feet, 10 inches of Ginch east
from 1st

Location **Temp taken over 5 feet, 10 inches of 12 inch cast**

1. General Information

[illegible]

TABLE 14.
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

June 6, 1904.

Readings taken between 4.10 and 4.15 p. m. at Appleton Street, Reservoir Street, Park Avenue and Cushing Street on Huron Avenue.

Appleton Street. Drop taken over 6 feet, 7 inches of 40-inch steel pipe.

Reservoir Street. Drop taken over 9 feet, 8 inches of 20-inch cast iron pipe.

Park Avenue. Drop taken over 5 feet, 10 inches of 6-inch cast iron pipe.

Cushing Street. Drop taken over 5 feet, 10 inches of 12-inch cast iron pipe.

Pipe bonded to track at Appleton Street.

| APPLETON STREET.
Current flowing east.
M. V. M. No. 14449. | RESERVOIR STREET.
Current flowing
towards steel main.
M. V. M. No. 679. | PARK AVENUE.
Current flowing
towards steel main.
Ins't No. 4116. | CUSHING STREET.
Current flowing
towards steel main.
M. V. M. No. 6789. |
|--|--|---|---|
| .25 | .5 | 1.10 | .35 |
| .25 | .8 | 1.25 | .40 |
| .28 | .7 | 1.40 | .35 |
| .30 | .6 | 1.40 | .40 |
| .25 | .6 | 1.15 | .40 |
| .28 | .6 | 1.55 | .40 |
| .35 | .5 | 1.40 | .35 |
| .35 | .4 | 1.45 | .40 |
| .35 | .8 | 1.20 | .40 |
| .30 | .8 | 1.40 | .35 |
| .28 | .6 | 1.20 | .40 |
| .25 | .5 | 1.45 | .40 |
| .22 | .5 | 1.25 | .30 |
| .25 | .7 | 1.00 | .35 |
| .20 | .7 | 1.05 | .35 |
| .20 | .6 | 1.00 | .35 |
| .15 | .8 | 1.20 | .35 |
| .20 | .7 | 1.00 | .30 |
| .15 | .6 | 1.20 | .25 |
| .25 | .5 | 1.45 | .30 |
| .25 | .4 | 1.00 | .35 |
| .21 | .7 | 1.30 | .40 |
| .25 | .5 | 1.25 | .30 |
| .21 | .8 | 1.20 | .40 |
| .20 | .7 | 1.05 | .40 |
| .25 | 1.0 | 1.40 | .35 |
| .25 | .7 | 1.20 | .40 |
| .25 | .5 | 1.45 | .40 |
| .25 | .5 | 1.25 | .40 |
| .25 | .4 | 1.70 | .40 |
| Ave. = .25 M. V.
30.5 Amp. | .6
.7
.8
.7
.8
.7
.6
Ave. = .64 M. V.
10.3 Amp. | Ave. = 1.26
= 1.62 M. V.
7.5 Amp. | Ave. = .37 M. V.
4.3 Amp. |

TABLE 16.
ELECTROLYTIC INVESTIGATION ON 40-INCH STEEL PIPE,
HURON AVENUE, CAMBRIDGE.

June 9, 1904.

Excavation East of Appleton Street.

Comparison between drop over one section of 40-inch steel pipe 6.9 feet long, and a length, including 14 sections and 14 joints, 92.6 feet long,

| Drop over 92.6 feet.
Milli Volts. | Drop over 6.9 feet.
Milli-Volts. | |
|--------------------------------------|-------------------------------------|---|
| 5.2 | .35 | |
| 5.2 | .35 | |
| 5.4 | .35 | |
| 5.1 | .35 | |
| — | | $\frac{5.20}{.35} = 14.9 \times 4 = 59.6$ |
| Ave. 5.2 | | |
| 4.4 | .3 | |
| 4.8 | .3 | |
| 4.8 | .3 | |
| 4.6 | .3 | |
| 4.6 | .3 | |
| 4.6 | .3 | |
| 4.4 | .3 | |
| 4.4 | .3 | |
| 4.6 | .3 | |
| 4.8 | .3 | |
| — | | $\frac{4.60}{.30} = 15.3 \times 10 = 153.0$ |
| Ave. 4.6 | | |
| 4.2 | .25 | |
| 4.0 | .25 | |
| 4.2 | .25 | |
| 4.2 | .25 | |
| 3.9 | .25 | |
| 3.8 | .25 | |
| — | | $\frac{4.10}{.25} = 16.4 \times 6 = 98.4$ |
| Ave. 4.1 | | |
| 3.4 | .2 | |
| 3.4 | .2 | |
| 3.4 | .2 | |
| 3.4 | .2 | |
| 3.2 | .2 | |
| 3.0 | .2 | |
| 3.0 | .2 | |
| 3.2 | .2 | |
| 3.0 | .2 | |
| 3.4 | .2 | |
| 2.9 | .2 | |
| 3.0 | .2 | |
| — | | $\frac{3.20}{.20} = 16.0 \times 12 = 192.0$ |
| Ave. 3.2 | | |
| 2.4 | .15 | |
| 2.5 | .15 | |
| — | | $\frac{2.40}{.15} = 16.3 \times 2 = 32.6$ |
| Ave. 2.45 | | |
| | | <div>34535.6</div> |

Average ratio between drops over 92.6 feet and 6.9 feet lengths = 15.8
Ratio between lengths = 13.4
Ratio between drop on pipe with joints and pipe without joints = 1.18

1
L J

R REGISTRAR

IN CHARGE OF THE
REGISTRY OF THE STATE OF TEXAS

THE REGISTRAR OF THE STATE OF TEXAS
IS A PUBLIC OFFICER WHOSE DUTY IT IS
TO REGISTER ALL DEEDS AND INSTRUMENTS
PRESENTED TO HIM FOR RECORD.

OFFICE OF THE REGISTRAR

STATE OF TEXAS
COUNTY OF DALLAS
CITY OF DALLAS
OFFICE OF THE REGISTRAR
1000 NORTH TEXAS STREET
DALLAS, TEXAS 75201

FOR FURTHER INFORMATION
CONTACT THE REGISTRAR

OFFICE OF THE REGISTRAR
STATE OF TEXAS
COUNTY OF DALLAS
CITY OF DALLAS
OFFICE OF THE REGISTRAR
1000 NORTH TEXAS STREET
DALLAS, TEXAS 75201

OFFICE OF THE REGISTRAR

OFFICE OF THE REGISTRAR
STATE OF TEXAS
COUNTY OF DALLAS
CITY OF DALLAS
OFFICE OF THE REGISTRAR
1000 NORTH TEXAS STREET
DALLAS, TEXAS 75201

REPORT OF THE WATER REGISTRAR

WATER REGISTRAR'S OFFICE,

CAMBRIDGE, December 1, 1914

to the Cambridge Water Board

CIVILIANS In compliance with the requirements of the City Ordinance I present the fortieth annual report of the operations of this department showing the receipts, expenditures and balances, together with a statement of the number of water takers, etc., for the year ending November 30, 1914

Amount of bills remaining unpaid November 30, 1914

| | |
|-----------------------|-----------|
| water rates | 04 472 73 |
| repairs and repairs | 7 7 43 |
| fund on | 12 10 |
| etc | 10 00 |
| miscellaneous account | 640 96 |
| subscription account | 247 33 |

Amount of bills placed in hands of City Registrar for collection from November 30, 1914

November 30, 1914

| | |
|-----------------------|-----------|
| water rates | 04 472 73 |
| repairs and repairs | 7 7 43 |
| fund on | 617 100 |
| etc | 10 00 |
| etc | 77 23 |
| miscellaneous account | 1 04 73 |
| subscription account | 2 032 37 |

Total bills

054 934 00

There has been collected

| | |
|-----------------------|-----------|
| water rates | 04 472 73 |
| repairs and repairs | 7 7 43 |
| fund on | 617 100 |
| etc | 10 00 |
| etc | 77 23 |
| miscellaneous account | 1 04 73 |
| subscription account | 2 032 37 |

There has been abated : —

| | |
|---|----------|
| Water rates, off and on, and seals, supplies and repairs,
and Construction account | 8,917 88 |
|---|----------|

There remains uncollected : —

| | | |
|--------------------------------|------------|--------------|
| Water rates | \$5,410 87 | |
| Supplies and repairs | 778 18 | |
| Off and on | 150 00 | |
| Seals | 8 50 | |
| Maintenance account | 602 62 | |
| Construction account | 156 26 | |
| | <hr/> | \$360,934 00 |

EXPENDITURES.

| | | |
|--|-------------|--------------|
| Construction (General account) | \$21,851 98 | |
| Maintenance (General account) | 97,845 40 | |
| | <hr/> | \$119,697 38 |

ABATEMENTS.

| | |
|--|------------|
| Water rate, Construction and supply and repair bills to
the amount of | \$3,917 88 |
|--|------------|

REFUNDS.

| | | |
|---|--------------|--------------|
| Water rates to the amount of | \$8,873 75 | |
| Which amount deducted from receipts | 342,483 02 | |
| | <hr/> | |
| Leaves net receipts for water | \$339,109 27 | |
| Add off and on, fines, rents, seals and Maintenance account | 1,964 32 | |
| | <hr/> | |
| Makes net receipts of rates, fines, etc. | | \$341,073 59 |

OFF AND ON.

Water has been shut off for non-payment of rates, or per order on account of vacancy, and seals have been applied to fixtures by request of owners, as follows : —

| | |
|--|-----|
| Water shut off in 1904 | 731 |
| Supplies let on, shut off in 1904 | 565 |
| Supplies let on, shut off in previous years | 98 |
| New supplies let on | 110 |
| Seal locks applied to fixtures in 1904 | 543 |
| Seal locks removed, put on in 1904 | 301 |
| Seal locks removed, put on in previous years | 349 |

Statement of yearly revenue received from water rates since the purchase of the works by the City : —

| | |
|--|-------------|
| From April 28, 1865, to December 1, 1865 | \$32,367 19 |
| From December 1, 1865, to December 1, 1866 | 40,073 27 |
| From December 1, 1866, to December 1, 1867 | 53,733 62 |

| | |
|--|------------|
| From November 1, 1867, to November 1, 1868 | 843 747 48 |
| From November 1, 1868, to November 1, 1869 | 74,149 30 |
| From November 1, 1869, to November 1, 1870 | 97,603 96 |
| From November 1, 1870, to November 1, 1871 | 111,742 63 |
| From November 1, 1871, to November 1, 1872 | 127,701 20 |
| From November 1, 1872, to November 1, 1873 | 146,117 23 |
| From November 1, 1873, to November 1, 1874 | 153,634 27 |
| From November 1, 1874, to November 1, 1875 | 134,480 27 |
| From November 1, 1875, to November 1, 1876 | 179,168 76 |
| From November 1, 1876, to November 1, 1877 | 154,843 30 |
| From November 1, 1877, to November 1, 1878 | 157,443 91 |
| From November 1, 1878, to November 1, 1879 | 164,641 90 |
| From November 1, 1879, to November 1, 1880 | 173,323 49 |
| From November 1, 1880, to November 1, 1881 | 170,063 73 |
| From November 1, 1881, to November 1, 1882 | 177,430 00 |
| From November 1, 1882, to November 1, 1883 | 177,341 00 |
| From November 1, 1883, to November 1, 1884 | 161,376 27 |
| From November 1, 1884, to November 1, 1885 | 183,344 36 |
| From November 1, 1885, to November 1, 1886 | 177,404 43 |
| From November 1, 1886, to November 1, 1887 | 214 744 64 |
| From November 1, 1887, to November 1, 1888 | 211 136 27 |
| From November 1, 1888, to November 1, 1889 | 221,174 70 |
| From November 1, 1889, to November 1, 1890 | 231,116 23 |
| From November 1, 1890, to November 1, 1891 | 257,054 53 |
| From November 1, 1891, to November 1, 1892 | 237 327 08 |
| From November 1, 1892, to November 1, 1893 | 242 219 78 |
| From November 1, 1893, to November 1, 1894 | 251 033 71 |
| From November 1, 1894, to November 1, 1895 | 244 018 63 |
| From November 1, 1895, to November 1, 1896 | 241,030 00 |
| From November 1, 1896, to November 1, 1897 | 271,437 63 |
| From November 1, 1897, to November 1, 1898 | 277,179 78 |
| From November 1, 1898, to November 1, 1899 | 272 343 70 |
| From November 1, 1899, to November 1, 1900 | 319 479 27 |
| From November 1, 1900, to November 1, 1901 | 321 468 01 |
| From November 1, 1901, to November 1, 1902 | 373,300 13 |
| From November 1, 1902, to November 1, 1903 | 333 777 34 |
| From November 1, 1903, to November 1, 1904 | 339 100 27 |

COMPARATIVE STATEMENT.

| | 1903. | | 1904. | |
|---|--------------|--------------|--------------|--------------|
| CONSTRUCTION ACCOUNT.
(HOBBS BROOK RESERVOIR.) | | | | |
| <i>Received.</i> | | | | |
| From surplus receipts..... | | \$12,229 61 | | \$797 84 |
| From bonds issued..... | | | | |
| <i>Expended.</i> | | | | |
| Construction of reservoir, land
settlements, services of City
Solicitor, etc..... | | 12,229 61 | | 797 84 |
| Balance to credit of Construction
Account | | | | |
| CONSTRUCTION ACCOUNT.
(GENERAL.) | | | | |
| <i>Received.</i> | | | | |
| From City of Waltham and sale
of old materials..... | \$5,727 85 | | \$2,145 64 | |
| From bonds issued..... | 11,025 61 | | | |
| From surplus receipts..... | 9,717 54 | | 6,261 44 | |
| Balance from 1903..... | | | 12,647 06 | |
| From premium on bonds..... | | \$26,471 00 | | \$21,054 14 |
| <i>Expended.</i> | | | | |
| Sundry bills and pay rolls..... | \$8,429 25 | | \$13,600 99 | |
| Meters and setting..... | 2,212 51 | | 3,899 12 | |
| Examination of Stony Brook main | 3,482 18 | | 3,454 03 | |
| Balance to credit of Construction
Account..... | 12,347 06 | | | |
| | | 26,471 00 | | 21,054 14 |
| MAINTENANCE ACCOUNT. | | | | |
| <i>Received.</i> | | | | |
| From "rates, fines, etc."..... | \$341,604 60 | | \$347,217 15 | |
| From supply and repair account. | 4,260 50 | | 3,372 21 | |
| From sale of shrubs, grass, etc... | 669 35 | | 1,093 07 | |
| Interest for 1902 reappropriated.. | 3,160 00 | | | |
| Interest for 1903 reappropriated.. | | | 4,280 00 | |
| | | \$349,694 45 | | \$355,962 43 |
| <i>Expended.</i> | | | | |
| Care and repairs.. | \$21,649 90 | | \$27,673 50 | |
| Work at Fresh Pond..... | 5,840 70 | | 9,996 83 | |
| Payson Park Reservoir..... | 801 81 | | 784 83 | |
| Hobbs Brook Reservoir..... | 1,203 07 | | 1,468 64 | |
| Stony Brook | 4,025 28 | | 2,999 96 | |
| Supplies and repairs, pipes and
fittings.... | 2,499 90 | | | |
| Salaries | 7,103 58 | | 9,463 50 | |
| Pumping, salaries and other ex-
penses | 20,704 71 | | 17,298 19 | |
| Ice for drinking fountains..... | 460 56 | | 460 35 | |
| Refunds..... | 3,169 06 | | 3,373 75 | |
| Abatements. | 3,756 43 | | 3,917 88 | |
| Sinking fund..... | 121,522 50 | | 121,522 50 | |
| Interest on water debt..... | 128,806 50 | | 126,126 50 | |
| Transferred to Construction Ac-
count..... | 21,947 15 | | 7,059 28 | |
| Interest on water debt reappro-
priated. | 4,280 00 | | | |
| Excess of receipts..... | 1,923 28 | | | |
| Fresh Pond grading | | | 12,500 00 | |
| Purchase of Metropolitan water.. | | | 14,000 00 | |
| Rent... .. | | | 1,200 00 | |
| | | 349,694 45 | | 359,845 31 |
| Maintenance account, excess of
receipts | | | | |
| | | \$1,923 28 | | \$3,682 88 |
| Maintenance account, deficit in
receipts | | | | |

In addition to the customary expenditures, there has been paid this year from the receipts from water the following amounts, viz :

| | |
|---------------------------------|-------------|
| Construction Account | \$7,429 34 |
| Metropolitan water | 13,918 00 |
| Grading at Fresh Pond Reservoir | 12 200 00 |
| | <hr/> |
| | \$34,347 34 |

If the above unusual expenditures had not occurred, there would have been excess receipts of over \$20,000,000

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 17,052 families, 527 stables, 2,500 houses for cows, 154 shops, 257 offices and stores, by the following fixtures, viz :

| | |
|----------------------|---------------------|
| 19 083 faucets | 23 urinals |
| 7,347 wash basins | 7 yard hydrants |
| 10 000 wash tubs | 1 fountain |
| 4,017 bath tubs | 12 tumblers washers |
| 106 ship closets | 1,623 hand basins |
| 17 097 water closets | 3 meters |
| 2 gutter closets | |

And

- 1 010 fire hydrants (including 19 on private premises)
- 0 fire reservoirs
- 70 drinking fountains in public squares
- 61 street watering steam-pipes
- 6 public sanitation.

The above schedule of fixtures does not include those in schools, houses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter

The usual house-to-house inspection has been made

Respectfully submitted,

WALTER H. HARDING,

Register

ANNUAL STATEMENT OF THE WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DECEMBER 1, 1904

Uncollected November 30, 1903: —

| | | |
|--------------------------------|-------------------|------------|
| Water rates | \$4,622 73 | |
| Supplies and repairs | 769 45 | |
| Off and on | 130 00 | |
| Seals | 10 00 | |
| Construction account | 269 33 | |
| Maintenance account | 600 96 | |
| | <u> </u> | \$6,402 47 |

Bills placed in the hands of City Treasurer for collection from December 1, 1903, to December 1, 1904: —

| | | |
|--------------------------------|-------------------|--------------------------------|
| Water rates | \$347,107 78 | |
| Supplies and repairs | 3,391 70 | |
| Off and on | 637 00 | |
| Rents | 168 00 | |
| Seals | 99 75 | |
| Maintenance account | 1,094 73 | |
| Construction account | 2,032 57 | |
| | <u> </u> | 354,531 53 |
| Total bills | | <u> </u> \$360,934 00 |

There has been collected : —

| | | |
|--------------------------------|-------------------|--------------|
| Water rates | \$342,483 02 | |
| Supplies and repairs | 3,372 21 | |
| Off and on | 604 00 | |
| Rents | 168 00 | |
| Seals | 99 25 | |
| Maintenance account | 1,093 07 | |
| Construction account | 2,090 64 | |
| | <u> </u> | |
| Total collections | | \$349,910 19 |

There has been abated : —

| | |
|--|------------|
| Water rates, off and on, and seals, supplies and repairs, and Construction account | \$3,917 88 |
|--|------------|

STATEMENT OF THE WATER REGISTAR

43

There remains uncollected

| | | |
|----------------------------|------------------|--------------|
| Water rates | \$3 610 37 | |
| Supplies and repairs | 770 16 | |
| Oil and gas | 120 00 | |
| Wages | 2 50 | |
| Maintenance account | 607 67 | |
| Extraordinary account | 124 74 | |
| | <u>07 105 93</u> | |
| Total bills for collection | | \$100.934 00 |

| | | |
|---------------|-------------------|--------------|
| Loss stated | \$1 917 40 | |
| Loss refunded | 8,373 78 | |
| Loss unpaid | 7,107 93 | |
| | <u>014 397 11</u> | |
| Net receipts | | \$316 136 66 |

Attest

WALTER H. HARDING,
Registrar

Commission Expires December 1906

We have examined the accounts of the Water Registrar and find that they correspond to the amounts collected stated refunded and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor

Committee on Finance

CITY OF CAMBRIDGE,
OFFICE OF CITY TREASURER.

To the Cambridge Water Board : —

I give you herewith a record of the transactions between the Water Office and the City Treasurer's Office during the year ending November 30, 1904.

| | |
|--|--------------|
| Gross collections for account of Water Works — "Maintenance," | |
| "Water Rates" and "Supply" Accounts | \$351,682 48 |
| Gross collections for account of Water Works — "Construction" | |
| Account | 2,145 64 |
| "Abatement" certificates received and paid on "Water Rates" . | 3,917 88 |
| "Refund" certificates received and paid to amount of | 3,873 75 |
| Uncollected bills in my hands November 30, 1904, for account of | |
| "Water Rates," "Maintenance" and "Supply" Accounts . | 6,949 67 |
| Uncollected bills November 30, 1904, for account of "Construction" | 156 26 |

Very respectfully,

WM. W. DALLINGER,
City Treasurer.

I have examined the above statement and find it correct.

HARRY T. UPHAM,
City Auditor.

REPORT OF THE SUPERINTENDENT OF WATER WORKS

CAMBRIDGE, December 3, 1904

To the Honorable Water Board of the City of Cambridge

SIR: In compliance with the City Ordinance, I herewith submit the annual report of the Superintendent for the year ending November 30, 1904.

| | |
|--|----------------|
| Total water pumped | 2,411,742.163 |
| Total water purchased from Metropolitan Water and Sewerage Board | 1,170,499.000 |
| Total water consumed | 1,241,243.163 |
| Gallons of water sold by meter | 1,162,743.200 |
| Gallons of water used for sprinkling streets | 100,000.000 |
| Gallons of water used for flushing sewers | 2,000,000.000 |
| Gallons of water used for clearing canals | 1,000,000.000 |
| Gallons of water used for public fountains | 20,000,000.000 |
| Gallons of water used for drinking fountains | 1,000,000.000 |
| Gallons of water used for testing meters | 6,125.000 |
| Gallons of water used for fire purposes | 9,000,000.000 |

Number of gallons sold for each class listed in the table above is as follows:

COMPARATIVE STATEMENT OF TOTAL GALLONS SOLD FOR THE LAST TEN YEARS

| Year | Total Gallons Sold | Increase or Decrease | Average Gallons Sold per Year | Total Gallons Sold for the Ten Years | Total Gallons Sold for the Ten Years |
|------|--------------------|----------------------|-------------------------------|--------------------------------------|--------------------------------------|
| 1895 | 1,100,000,000 | 01,000,000 increase | 1,100,000,000 | 11,000,000,000 | 11,000,000,000 |
| 1896 | 1,110,000,000 | 10,000,000 increase | 1,110,000,000 | 12,100,000,000 | 12,100,000,000 |
| 1897 | 1,120,000,000 | 10,000,000 increase | 1,120,000,000 | 13,200,000,000 | 13,200,000,000 |
| 1898 | 1,130,000,000 | 10,000,000 increase | 1,130,000,000 | 14,300,000,000 | 14,300,000,000 |
| 1899 | 1,140,000,000 | 10,000,000 increase | 1,140,000,000 | 15,400,000,000 | 15,400,000,000 |
| 1900 | 1,150,000,000 | 10,000,000 increase | 1,150,000,000 | 16,500,000,000 | 16,500,000,000 |
| 1901 | 1,160,000,000 | 10,000,000 increase | 1,160,000,000 | 17,600,000,000 | 17,600,000,000 |
| 1902 | 1,170,000,000 | 10,000,000 increase | 1,170,000,000 | 18,700,000,000 | 18,700,000,000 |
| 1903 | 1,180,000,000 | 10,000,000 increase | 1,180,000,000 | 19,800,000,000 | 19,800,000,000 |
| 1904 | 1,190,000,000 | 10,000,000 increase | 1,190,000,000 | 20,900,000,000 | 20,900,000,000 |

| | |
|--|-------------|
| Total amount of cash received | \$12,000.00 |
| Amount received in 1895 from Metropolitan Water and Sewerage Board | \$1,000.00 |
| Total amount used for pumping purposes | \$1,000.00 |
| Total average amount used for pumping purposes | \$1,000.00 |
| Total average net total amount received | \$1,000.00 |

| | |
|--|------------|
| Coal consumed per million gallons pumped | 1,272 lbs. |
| Highest water elevation in Fresh Pond was on June 4th | 17.09 |
| Lowest water elevation in Fresh Pond was on February 28th | 9.42 |
| Average height of water in Fresh Pond | 12.68 |
| Highest water elevation in Stony Brook Reservoir was on April 30th | 83.04 |
| Lowest water elevation in Stony Brook Reservoir was on July 17th | 79.79 |
| Highest water elevation in Hobbs Brook Reservoir No. 1, Lincoln Street, was on April 30th | 182.05 |
| Lowest water elevation in Hobbs Brook Reservoir No. 1, Lincoln Street, was on September 14th | 180.15 |
| Highest water elevation in Hobbs Brook Reservoir No. 2, Winter Street, was on April 30th | 182.00 |
| Lowest water elevation in Hobbs Brook Reservoir No. 2, Winter Street, was on November 13th | 178.50 |
| Total rainfall at Fresh Pond Pumping Station | 42.80 |
| Total rainfall at Stony Brook Reservoir | 41.18 |
| Total rainfall at Hobbs Brook Reservoir | 39.95 |

TOTAL RAINFALL FOR THE PAST TEN YEARS.

| Month. | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | In. | In. | In. | In. | In. | In. | In. | In. | In. | In. |
| December..... | 4.43 | 1.90 | 1.63 | 4.31 | 2.00 | 1.30 | 1.74 | 7.71 | 4.37 | 2.87 |
| January..... | 3.57 | 2.46 | 3.32 | 4.75 | 3.85 | 4.40 | 1.55 | 1.97 | 3.19 | 5.00 |
| February..... | 1.07 | 5.62 | 2.36 | 3.61 | 3.99 | 7.34 | .79 | 4.29 | 3.50 | 3.00 |
| March..... | 2.68 | 4.37 | 2.66 | 2.03 | 5.94 | 5.10 | 6.89 | 6.16 | 4.89 | 2.35 |
| April..... | 4.15 | 1.70 | 2.82 | 6.22 | 1.32 | 1.99 | 8.80 | 3.56 | 3.93 | 8.57 |
| May | 2.39 | 2.42 | 4.24 | 3.92 | .77 | 5.52 | 6.96 | 1.08 | .35 | 3.58 |
| June | 2.76 | 2.33 | 5.16 | 1.82 | 3.17 | 2.75 | 1.33 | 2.40 | 8.46 | 2.74 |
| July | 3.28 | 2.65 | 4.68 | 4.50 | 3.12 | 2.31 | 4.70 | 3.14 | 3.72 | 1.70 |
| August..... | 4.71 | 2.45 | 5.06 | 7.34 | 3.21 | 2.80 | 4.17 | 3.62 | 3.81 | 2.53 |
| September..... | 1.83 | 6.29 | 3.22 | 1.78 | 4.63 | 4.40 | 3.74 | 3.36 | 1.72 | 5.87 |
| October..... | 10.16 | 3.10 | .55 | 7.22 | 3.08 | 3.75 | 2.86 | 4.65 | 4.54 | 1.85 |
| November..... | 6.09 | 3.53 | 6.83 | 4.92 | 2.20 | 5.25 | 2.67 | 1.37 | 1.70 | 2.83 |
| Total | 47.12 | 38.82 | 42.53 | 52.42 | 37.28 | 46.89 | 46.20 | 43.31 | 44.23 | 42.89 |

FRESH POND AND SURROUNDINGS.

The work of caring for the grounds, walks and roads about the Pond this year has employed more help than last, and the condition has been much more satisfactory.

The work of improving that portion of the borders of the Pond known as Kingsley Park, in accordance with the plans of Messrs. Olmsted Brothers, was begun on August 29th, and has continued to the present time, giving employment to some sixty men, and twenty to thirty teams. The work has so far progressed that a comparatively small appropriation will be necessary to finish it.

On April 27th, the water in the Pond having fallen to grade 10.90, it was deemed wise by the Water Board to purchase water from the

.

7

Water and Sewerage Board to supply the City while the
 Fresh Pond is filling. According to the gate
 being closed, located in the Cambridge Town, was
 closed and the City supplied through the Avedon water
 works, until June 4th, when the Fresh Pond was
 again supplied was shut off.

The Fresh Pond was returned on that date.

The water was returned by the City while the gate was open.

The Fresh Pond level having fallen to 11.84, the gate
 was closed and is at present being supplied with water from

the Fresh Pond, not needed by the Cambridge
 water works.

The water for the year was 12,000.

STATE OF THE FRESH POND.

The gate has been closed for the purpose of
 maintaining the level of the pond at 11.84, and
 the water is being supplied to the Cambridge
 water works.

Water level at Fresh Pond, Cambridge, Mass.,
 1888.

Water level at Fresh Pond, Cambridge, Mass.,
 1888.

Metropolitan Water and Sewerage Board to supply the City while the water from Stony Brook was filling Fresh Pond. Accordingly, the gate on the forty-eight inch line, located in the Cambridge Common, was opened on April 27th, and the City supplied through the Venturi meter connected with the same, until June 4th, when the Pond had risen to grade 17.09 and the supply was shut off.

The pumping from the Pond was resumed on that date.

The amount of water consumed by the City while the gate was open was 331,540,000 gallons.

On November 24th, the Pond level having fallen to 11.99, the gate was again opened and we are at present being supplied with Metropolitan water.

The standing grass around the Pond, not needed by the department, has been sold at public auction.

The average height of the Pond for the year has been 12.68.

FRESH POND RESERVOIR.

| | | | |
|---------------|-------|-------|-------|
| September 29. | 13.33 | ..... | 0.81 |
| October 1. | 12.86 | ..... |  |
| October 31. | 12.61 | ..... | 1.85 |
| November 24. | 11.99 | ..... |  |
| November 30. | 12.83 | ..... | 2.83 |
| | | | 42.89 |

PUMPING STATION AND GROUNDS.

The buildings at the station have been painted and are in good condition.

The grounds have received the usual care.

On September 10th, Mr. E. I. Harris, who had been Chief Engineer since May 1, 1898, resigned, and Mr. William H. Blaisdell, for the past fourteen years Assistant Engineer, was appointed Chief Engineer.

Mr. George F. Haven has been appointed Assistant Engineer, to succeed Mr. Blaisdell.

The engines and boilers have received but slight repairs in the past year; but during the time when the engines have been stopped opportunity has been given for making the necessary cleaning, inspection and repairs

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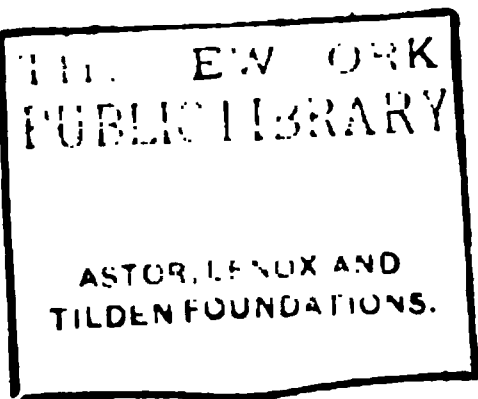
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OPERATING EXPENSES AT PUMPING STATION.

| | | | | |
|---------------------------------|---|---|---|-------------|
| Buildings, repairs and painting | . | . | . | \$1,103.05 |
| Coal | . | . | . | 7,998.73 |
| Express | . | . | . | 16.34 |
| Ice | . | . | . | 29.00 |
| Lighting | . | . | . | 83.28 |
| Oil, grease and packing | . | . | . | 467.88 |
| Repairs, boiler | . | . | . | 123.61 |
| Repairs, engines | . | . | . | 195.06 |
| Telephone | . | . | . | 60.74 |
| Tools and hardware | . | . | . | 65.22 |
| Miscellaneous | . | . | . | 66.03 |
| Salaries | . | . | . | 7,089.25 |
| | | | | <hr/> |
| | | | | \$17,298.19 |

OPERATING EXPENSES AT PUMPING STATION

| | |
|---------------------------------|-------------|
| Buildings, repairs and painting | \$1,193.05 |
| Coal | 7,998.73 |
| Express | 16.34 |
| Ice | 29.00 |
| Lighting | 83.28 |
| Oil, grease and packing | 467.88 |
| Repairs, tools | 123.61 |
| Repairs, pumps | 195.06 |
| Telephone | 60.74 |
| Travel, messengers | 65.22 |
| Wages, messengers | 66.73 |
| Supplies | 7,089.25 |
| | <hr/> |
| | \$17,298.19 |



THE FORTY INCH STEEL DISTRIBUTING MAIN

During the month of March, last, a leak occurred on this line near Appletown Street, and upon digging down we found a hole about five-eighths of an inch in diameter through the pipe and pittings around the hole that seemed to indicate electrolysis. A further examination was made that the pipe was in such condition that a thorough examination was necessary and consequently about four hundred feet were uncovered, and a length more than four hundred pittings were found.

During the time of investigation and repair, nine holes developed, and were plugged temporarily with plug pipe.

As to the section near Appletown Street, another section between Bayweather Street and Lake View Avenue developed three more holes, that on inspection seemed to be in bad condition, in some respects worse than the pipe near Appletown Street, as will be seen from the accompanying accompanying. For this we are indebted to Mr. Dexter from the Department of Distribution of Metropolitan Water and Sewerage Board, as well as for some of the details of the electrical report.

The matter of the repair of the pipe was discussed.

As the main is in a bad condition, the necessary means could not be taken to repair the hole to tap and plug, and it was decided to repair the hole by the method shown in the sketch of this report.

In order to cover the places affected, were made of the water which was used to cover the shape of the pipe to be repaired, and a guard of the first rubber packing was made of the latter and of the pipe to be repaired. These put the guard was then held by the water to the pipe, which was protected. Where the pipe was covered the pipe of the damage, the guard was made of the pipe.

After the work of the repair, the pipe was in a good condition.

As the pipe is in a bad condition, the necessary means could not be taken to repair the hole to tap and plug, and it was decided to repair the hole by the method shown in the sketch of this report. Mr. Charles H. Moore, expert of the Water Department, assisted in the work of the repair. The work was done by Mr. Moore of the Engineering Department of the Metropolitan Water Works. The report of Mr. Moore is attached.

As the pipe was repaired, the hole was in a good condition.

Insulating joints have been placed in Reservoir Street in the twenty-inch (20-in.) cast iron main, connecting to the forty-inch (40-in.) steel line; and in the twelve-inch (12-in.) line in Cushing Street.

One insulating joint in the six-inch (6 in.) line in Park Avenue remains to be placed.

These joints are of the same design as those used by the Metropolitan Water Works, a sketch of which is shown.

The forty-inch (40-in.) pipe has also been connected to the rails of both tracks at Sparks Street with a suitable switch, and stations for observation have been made at different points on the line.

PAYSON PARK RESERVOIR.

The grounds about the reservoir are in good condition.

The gate house will need to have the stone work thoroughly pointed and the wood work painted this season.

PIPE YARD.

The dwelling house and shed should be shingled and the stable have new doors this season.

The shop will need no repairs.

HIGH SERVICE.

Following is the list of streets supplied from the high service : —

| | |
|---|---|
| Agassiz Street. | Holly Avenue. |
| Appleton Street, from Highland Street
to beyond Hutchinson Street. | Humboldt Street. |
| Arlington Street. | Huron Avenue, from Appleton Street to
Raymond Street. |
| Avon Hill Street. | Lancaster Street. |
| Bates Street. | Linnaean Street. |
| Bellevue Avenue. | Mount Pleasant Street. |
| Bellevue Avenue, west. | Raymond Street, from Linnaean Street
to Walden Street. |
| Buena Vista Park. | Reservoir Street, from Highland Street. |
| Concord Avenue, from Huron Avenue
to Buckingham Street. | Upland Road, from Richdale Avenue to
Huron Avenue. |
| Garden Street, from Huron Avenue to
Linnaean Street. | Vassal Lane from Huron Avenue. |
| Highland Street, from Reservoir Street
to Appleton Street. | Vincent Street. |
| Hillside Avenue. | Walnut Avenue. |
| | Washington Avenue. |

The repairs on this main necessitated a great expense which was not anticipated nor provided for in our annual appropriation. The cost of labor alone was fourteen hundred fifty dollars and fifty cents (\$1,450.50).

The following account of leaks were reported by our inspectors and were found by them on the annual canvass : —

- Three hundred sixty-one (361) on faucets.
- Fourteen hundred thirty-two (1,432) on water closets.
- Twenty-eight (28) on pipes.
- Twelve (12) on tanks.
- Fourteen (14) on basins.
- Eight (8) on bath tubs.
- Five (5) on set tubs.
- Five (5) on stops and wastes.

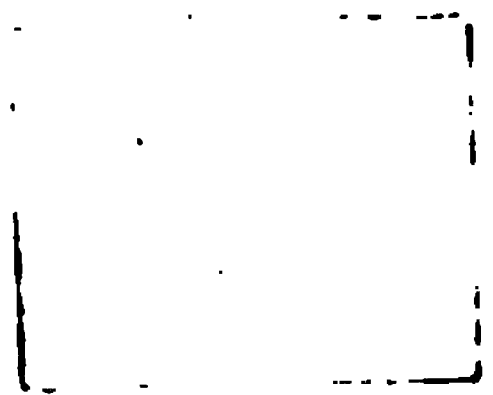
TABLE SHOWING GAIN IN THE TOTAL CONSUMPTION FOR THE YEAR 1904 OVER THE YEAR 1903.

| | Total Consump-
tion 1904. | Total Consump-
tion 1903. | Increase. | Decrease. |
|-----------------|------------------------------|------------------------------|------------|------------|
| 1903 | | | | |
| December..... | 275,246,840 | 281,443,360 | ..... | 6,196,520 |
| 1904 | | | | |
| January | 304,044,400 | 301,018,080 | 3,026,320 | ..... |
| February..... | 292,277,480 | 250,631,040 | 41,646,440 | ..... |
| March..... | 260,823,640 | 254,024,760 | 6,798,880 | ..... |
| April..... | 242,749,840 | 244,855,160 | ..... | 2,105,320 |
| May | 274,400,000 | 281,320,600 | ..... | 6,920,600 |
| June..... | 266,626,785 | 278,104,040 | ..... | 11,477,255 |
| July | 271,311,120 | 282,725,080 | ..... | 11,410,960 |
| August..... | 262,107,120 | 247,052,080 | 15,055,040 | ..... |
| September | 252,276,200 | 239,901,640 | 12,374,560 | ..... |
| October..... | 265,614,800 | 259,578,880 | 6,035,920 | ..... |
| November..... | 243,500,920 | 240,049,040 | 3,451,880 | ..... |
| Total..... | 3,210,982,145 | 3,160,704,360 | 50,277,785 | ..... |

MAIN PIPE.

Five thousand, one hundred seventy-four and one-half (5,174½) feet of main pipes have been laid during the year, of which one thousand, four hundred eleven and one-half (1,411½) feet were laid for extensions, and three thousand, seven hundred sixty-three (3,763) feet were laid for renewals of main pipes which had been in use for many years.

The tables of main pipes laid will be found on pages 57 and 67.



The following named streets are those in which the main pipes have been renewed

In Harvard Street, from Hancock Street to connect to ten inch main laid in 1911, four hundred sixty (460) feet of ten inch pipe have been laid this will take the place of the six inch pipe formerly in this location, which was inadequate and old, having been laid in 1907

In Lake Street, from Magazine Street to Pearl Street, the old six inch main, laid in 1868, has been removed and four hundred fifty (450) feet of six inch pipe have been laid

In Park Street, from Magazine Street to Pleasant Street, five hundred forty seven (447) feet of six inch pipe have been laid. the old four inch pipe which has supplied this vicinity since 1867 and 1869, has been removed

In Perry Street, from Magazine Street to Pearl Street, four hundred forty seven (447) feet of six inch pipe have been laid a four inch pipe has previously supplied this section and has been in use since it was first laid, three different years, i. e., 1868, 1870 and 1872

In River Street, from Blackstone Street and connected with sewer by a side off, three hundred fifty four (354) feet have been laid, the department has removed the six inch pipe which has supplied this section since 1872

In Rockwell Street, from Pleasant Street to River Street four hundred twenty two (422) feet of six inch pipe have been laid the four inch pipe laid in 1868, has been removed

In Union Street, from Magazine Street to Pleasant Street, the old four inch pipe, laid in 1867, has been replaced by five hundred thirty six (536) feet of six inch pipe

In Warland Street, from Magazine Street to Pleasant Street, five hundred seven (507) feet of six inch pipe have been laid the old four inch pipe part of which was laid in 1867, and a part in 1872, has been removed

The inspection and blowing off of all the main pipes in the City have been found to be of much benefit to the collection of the water that now may be considered an annual necessity

This Spring it was again made under the direction of a foreman in the department with good results

In addition to this, during the season several cases of disturbed condition of water have been cared for separately by thoroughly blowing off the mains, whose conditions have been reported; in the majority of cases the sections where these complaints arise are supplied by pipes having dead ends.

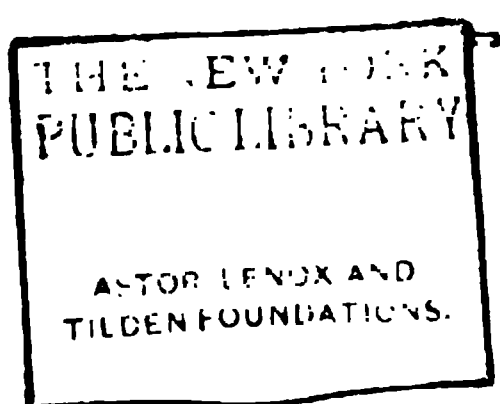
As in former years, the department has responded to the requests of the Sewer and Street Departments, during their works of construction, and in each case where repairs have been made necessary by the building of new work, the cost of the same has been charged and met by the constructing department.

In Dinsmore Court the four-inch main pipe has been raised throughout its entire length.

In Green Street, from Pleasant Street to Vernon Street, the old four-inch pipe has been removed in order to give its location to the Cambridge Sewer Department, which has constructed a sewer in the street. The old four-inch main was laid in the years 1869 and 1871.

In December, 1903, a connection was made between the twenty-four-inch mains and the supply main of the Metropolitan Water and Sewerage Board at the location in Cambridge Common opposite Holmes Place, where these pipes cross.

. See page 46 for a more extended account of the necessity for this connection.



MAIN TUNNELS WITH LATERAL AND BRANCH HYDRANTS

TABLE OF THE MAIN TUNNELS

Length in feet

| Name of Tunnel | Length in feet | Diameter in feet | Depth in feet | Number of Hydrants |
|---------------------------|----------------|------------------|---------------|--------------------|
| | | | | |
| 1. Main Tunnel, No. 1 | 1,200 | 4.0 | 10.0 | 12 |
| 2. Main Tunnel, No. 2 | 1,500 | 4.0 | 10.0 | 15 |
| 3. Main Tunnel, No. 3 | 1,800 | 4.0 | 10.0 | 18 |
| 4. Main Tunnel, No. 4 | 2,100 | 4.0 | 10.0 | 21 |
| 5. Main Tunnel, No. 5 | 2,400 | 4.0 | 10.0 | 24 |
| 6. Main Tunnel, No. 6 | 2,700 | 4.0 | 10.0 | 27 |
| 7. Main Tunnel, No. 7 | 3,000 | 4.0 | 10.0 | 30 |
| 8. Main Tunnel, No. 8 | 3,300 | 4.0 | 10.0 | 33 |
| 9. Main Tunnel, No. 9 | 3,600 | 4.0 | 10.0 | 36 |
| 10. Main Tunnel, No. 10 | 3,900 | 4.0 | 10.0 | 39 |
| 11. Main Tunnel, No. 11 | 4,200 | 4.0 | 10.0 | 42 |
| 12. Main Tunnel, No. 12 | 4,500 | 4.0 | 10.0 | 45 |
| 13. Main Tunnel, No. 13 | 4,800 | 4.0 | 10.0 | 48 |
| 14. Main Tunnel, No. 14 | 5,100 | 4.0 | 10.0 | 51 |
| 15. Main Tunnel, No. 15 | 5,400 | 4.0 | 10.0 | 54 |
| 16. Main Tunnel, No. 16 | 5,700 | 4.0 | 10.0 | 57 |
| 17. Main Tunnel, No. 17 | 6,000 | 4.0 | 10.0 | 60 |
| 18. Main Tunnel, No. 18 | 6,300 | 4.0 | 10.0 | 63 |
| 19. Main Tunnel, No. 19 | 6,600 | 4.0 | 10.0 | 66 |
| 20. Main Tunnel, No. 20 | 6,900 | 4.0 | 10.0 | 69 |
| 21. Main Tunnel, No. 21 | 7,200 | 4.0 | 10.0 | 72 |
| 22. Main Tunnel, No. 22 | 7,500 | 4.0 | 10.0 | 75 |
| 23. Main Tunnel, No. 23 | 7,800 | 4.0 | 10.0 | 78 |
| 24. Main Tunnel, No. 24 | 8,100 | 4.0 | 10.0 | 81 |
| 25. Main Tunnel, No. 25 | 8,400 | 4.0 | 10.0 | 84 |
| 26. Main Tunnel, No. 26 | 8,700 | 4.0 | 10.0 | 87 |
| 27. Main Tunnel, No. 27 | 9,000 | 4.0 | 10.0 | 90 |
| 28. Main Tunnel, No. 28 | 9,300 | 4.0 | 10.0 | 93 |
| 29. Main Tunnel, No. 29 | 9,600 | 4.0 | 10.0 | 96 |
| 30. Main Tunnel, No. 30 | 9,900 | 4.0 | 10.0 | 99 |
| 31. Main Tunnel, No. 31 | 10,200 | 4.0 | 10.0 | 102 |
| 32. Main Tunnel, No. 32 | 10,500 | 4.0 | 10.0 | 105 |
| 33. Main Tunnel, No. 33 | 10,800 | 4.0 | 10.0 | 108 |
| 34. Main Tunnel, No. 34 | 11,100 | 4.0 | 10.0 | 111 |
| 35. Main Tunnel, No. 35 | 11,400 | 4.0 | 10.0 | 114 |
| 36. Main Tunnel, No. 36 | 11,700 | 4.0 | 10.0 | 117 |
| 37. Main Tunnel, No. 37 | 12,000 | 4.0 | 10.0 | 120 |
| 38. Main Tunnel, No. 38 | 12,300 | 4.0 | 10.0 | 123 |
| 39. Main Tunnel, No. 39 | 12,600 | 4.0 | 10.0 | 126 |
| 40. Main Tunnel, No. 40 | 12,900 | 4.0 | 10.0 | 129 |
| 41. Main Tunnel, No. 41 | 13,200 | 4.0 | 10.0 | 132 |
| 42. Main Tunnel, No. 42 | 13,500 | 4.0 | 10.0 | 135 |
| 43. Main Tunnel, No. 43 | 13,800 | 4.0 | 10.0 | 138 |
| 44. Main Tunnel, No. 44 | 14,100 | 4.0 | 10.0 | 141 |
| 45. Main Tunnel, No. 45 | 14,400 | 4.0 | 10.0 | 144 |
| 46. Main Tunnel, No. 46 | 14,700 | 4.0 | 10.0 | 147 |
| 47. Main Tunnel, No. 47 | 15,000 | 4.0 | 10.0 | 150 |
| 48. Main Tunnel, No. 48 | 15,300 | 4.0 | 10.0 | 153 |
| 49. Main Tunnel, No. 49 | 15,600 | 4.0 | 10.0 | 156 |
| 50. Main Tunnel, No. 50 | 15,900 | 4.0 | 10.0 | 159 |
| 51. Main Tunnel, No. 51 | 16,200 | 4.0 | 10.0 | 162 |
| 52. Main Tunnel, No. 52 | 16,500 | 4.0 | 10.0 | 165 |
| 53. Main Tunnel, No. 53 | 16,800 | 4.0 | 10.0 | 168 |
| 54. Main Tunnel, No. 54 | 17,100 | 4.0 | 10.0 | 171 |
| 55. Main Tunnel, No. 55 | 17,400 | 4.0 | 10.0 | 174 |
| 56. Main Tunnel, No. 56 | 17,700 | 4.0 | 10.0 | 177 |
| 57. Main Tunnel, No. 57 | 18,000 | 4.0 | 10.0 | 180 |
| 58. Main Tunnel, No. 58 | 18,300 | 4.0 | 10.0 | 183 |
| 59. Main Tunnel, No. 59 | 18,600 | 4.0 | 10.0 | 186 |
| 60. Main Tunnel, No. 60 | 18,900 | 4.0 | 10.0 | 189 |
| 61. Main Tunnel, No. 61 | 19,200 | 4.0 | 10.0 | 192 |
| 62. Main Tunnel, No. 62 | 19,500 | 4.0 | 10.0 | 195 |
| 63. Main Tunnel, No. 63 | 19,800 | 4.0 | 10.0 | 198 |
| 64. Main Tunnel, No. 64 | 20,100 | 4.0 | 10.0 | 201 |
| 65. Main Tunnel, No. 65 | 20,400 | 4.0 | 10.0 | 204 |
| 66. Main Tunnel, No. 66 | 20,700 | 4.0 | 10.0 | 207 |
| 67. Main Tunnel, No. 67 | 21,000 | 4.0 | 10.0 | 210 |
| 68. Main Tunnel, No. 68 | 21,300 | 4.0 | 10.0 | 213 |
| 69. Main Tunnel, No. 69 | 21,600 | 4.0 | 10.0 | 216 |
| 70. Main Tunnel, No. 70 | 21,900 | 4.0 | 10.0 | 219 |
| 71. Main Tunnel, No. 71 | 22,200 | 4.0 | 10.0 | 222 |
| 72. Main Tunnel, No. 72 | 22,500 | 4.0 | 10.0 | 225 |
| 73. Main Tunnel, No. 73 | 22,800 | 4.0 | 10.0 | 228 |
| 74. Main Tunnel, No. 74 | 23,100 | 4.0 | 10.0 | 231 |
| 75. Main Tunnel, No. 75 | 23,400 | 4.0 | 10.0 | 234 |
| 76. Main Tunnel, No. 76 | 23,700 | 4.0 | 10.0 | 237 |
| 77. Main Tunnel, No. 77 | 24,000 | 4.0 | 10.0 | 240 |
| 78. Main Tunnel, No. 78 | 24,300 | 4.0 | 10.0 | 243 |
| 79. Main Tunnel, No. 79 | 24,600 | 4.0 | 10.0 | 246 |
| 80. Main Tunnel, No. 80 | 24,900 | 4.0 | 10.0 | 249 |
| 81. Main Tunnel, No. 81 | 25,200 | 4.0 | 10.0 | 252 |
| 82. Main Tunnel, No. 82 | 25,500 | 4.0 | 10.0 | 255 |
| 83. Main Tunnel, No. 83 | 25,800 | 4.0 | 10.0 | 258 |
| 84. Main Tunnel, No. 84 | 26,100 | 4.0 | 10.0 | 261 |
| 85. Main Tunnel, No. 85 | 26,400 | 4.0 | 10.0 | 264 |
| 86. Main Tunnel, No. 86 | 26,700 | 4.0 | 10.0 | 267 |
| 87. Main Tunnel, No. 87 | 27,000 | 4.0 | 10.0 | 270 |
| 88. Main Tunnel, No. 88 | 27,300 | 4.0 | 10.0 | 273 |
| 89. Main Tunnel, No. 89 | 27,600 | 4.0 | 10.0 | 276 |
| 90. Main Tunnel, No. 90 | 27,900 | 4.0 | 10.0 | 279 |
| 91. Main Tunnel, No. 91 | 28,200 | 4.0 | 10.0 | 282 |
| 92. Main Tunnel, No. 92 | 28,500 | 4.0 | 10.0 | 285 |
| 93. Main Tunnel, No. 93 | 28,800 | 4.0 | 10.0 | 288 |
| 94. Main Tunnel, No. 94 | 29,100 | 4.0 | 10.0 | 291 |
| 95. Main Tunnel, No. 95 | 29,400 | 4.0 | 10.0 | 294 |
| 96. Main Tunnel, No. 96 | 29,700 | 4.0 | 10.0 | 297 |
| 97. Main Tunnel, No. 97 | 30,000 | 4.0 | 10.0 | 300 |
| 98. Main Tunnel, No. 98 | 30,300 | 4.0 | 10.0 | 303 |
| 99. Main Tunnel, No. 99 | 30,600 | 4.0 | 10.0 | 306 |
| 100. Main Tunnel, No. 100 | 30,900 | 4.0 | 10.0 | 309 |

SUPPLIES.

The total number of supplies laid to date, November 30, 1904, is fourteen thousand eight hundred three (14,803).

See page 66 for recapitulation table of these supplies with pipe, valves, etc., furnished.

One hundred four (104) supplies were laid of galvanized pipe in sizes from three-fourth-inch to two-inch inclusive, and seven (7) supplies were of cast iron pipe and laid in the following locations:—

One four-inch for E. & R. Laundry on Massachusetts Avenue at Winsor Street.

One four-inch for A. H. Hews Company on Crescent Avenue.

One four-inch for Dr. Sargent's Gymnasium on Everett Street.

One four-inch for Asa C. Lamson on Main Street.

Two four-inch for Isaac McLean on Mount Auburn Street.

One six-inch (one thousand forty (1,040) feet in length) for Harvard University from Kirkland Street across the grounds to Massachusetts Avenue.

The total number of supplies laid during the year, *i. e.*, one hundred eleven (111) is the smallest annual number laid with one exception: in 1878 only one hundred two (102) supplies were laid during the year.

In 1894, ten years ago, there were four hundred thirteen (413) supplies laid

This exhibit shows the small amount of construction of new buildings that has been done during the year.

Thirty-nine (39) old supplies have been furnished with sidewalk shut off cocks and boxes.

In Dinsmore Court, where the main pipes and supplies were too deep, the entire number of supplies, fourteen, (14) were renewed.

In Green Street, at Vernon Street, etc., four (4) old supplies formerly on the old four-inch main have been renewed in the street and connected to the twenty-inch main.

One hundred seventy-two (172) supplies have been renewed in cases where the original supplies were old, leaking or too small to supply the premises.

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ASTOR LENOX AND
TILDEN FOUNDATIONS

Two supplies have been extended

For the use of the George C. Page Box Company, the four inch supply has been removed and a six inch laid in its location

In the following named streets, where the main pipes have been renewed, the supplies also have been renewed in the streets to the property lines as follows

| | | |
|-----------------|----|------------|
| Harvard Street | 7 | 3 1/2 inch |
| | 2 | 1 inch |
| Lake Street | 6 | 3 1/2 inch |
| Park Street | 13 | 3 1/2 inch |
| Perry Street | 13 | 3 1/2 inch |
| River Street | 6 | 3 1/2 inch |
| | 1 | 1 inch |
| Rockwell Street | 12 | 3 1/2 inch |
| Tyden Street | 15 | 3 1/2 inch |
| Warland Street | 8 | 3 1/2 inch |
| | 4 | 1 inch |

87

The number of supplies renewed during the year was two hundred and twenty eight (278).

Following is the list of establishments having fire protection from the City of Cambridge

| | | |
|-----------------------------------|----------------------|-------------|
| American Rubber Co. | Hinney Street. | Two 6 in |
| American Net & Twine Co. | Third Street. | Two 6 in |
| American Net & Twine Co. | Third Street. | 6 in |
| American Vulcanized Fibre Co. | Tanners Street. | 2 in |
| Barker Asphalt Paving Co. | First Street. | 6 in |
| East State Metal Works. | Harvard Street. | 6 in |
| Barrett & Shepard. | Union Street. | 2 in |
| Beale George F. Manufacturing Co. | Hinney Street. | 6 in |
| " " " " | Third Street. | 6 in |
| Boston & North Reading Co. | Mt. Auburn Street. | 6 in & 6 in |
| Boston Elevated Railway Co. | Habern Street. | 2 in & 6 in |
| " " " " | Cambridge Street. | Two 2 in |
| " " " " | Parkman Street. | Three 6 in |
| " " " " | Massachusetts Avenue | 6 in |
| " " " " | Mt. Auburn Street. | 6 in & 2 in |
| " " " " | Murray Street. | 6 in |
| " " " " | River Street. | 6 in |
| Boston & Maine Railroad | Bridge Street. | 6 in |
| " " " " | Bridge Street. | 6 in |
| " " " " | East Street. | 6 in |
| " " " " | Prison Point Street. | 6 in |

| | | |
|--|-------------------------------|----------------|
| Boston Woven Hose & Rubber Co., | Portland Street, . . . | 8-in. & 10-in. |
| Cambridge Gas Light Co., . . . | Third Street, . . . | 6-in. |
| Cambridge Electric Light Co., . . | Western Avenue, . . . | 6-in. |
| Cambridge Laundry, . . . | Kinnaird Street, . . . | 6-in. |
| Cambridge Mutual Fire Insurance Co., | Massachusetts Avenue, . . | 2-in. |
| Chelmsford Foundry Co., . . . | Portland Street, . . . | 2-in. |
| Dover Stamping Co., . . . | Pleasant Street, . . . | 6-in. |
| Fogarty & Daly, . . . | Massachusetts Avenue, . . | 4-in. |
| Ginn & Co., . . . | First Street, . . . | Two 6-in. |
| " " . . . | Athenaeum Street, . . . | 8-in. |
| Goepper Bros., . . . | Ninth Street, . . . | 1-1-2-in. |
| Harvard University, . . . | Harvard Union, Harvard St., | 4-in. |
| " " . . . | Memorial Hall, Cambridge St., | 4-in. |
| " " . . . | Observatory, Concord Ave., | 6-in. |
| " " . . . | Semitic Mus'm, Divinity Ave., | 4-in. |
| Hews, A. H., Co., . . . | Crescent Avenue, . . . | Two 4-in. |
| Holy Ghost Hospital for Incurables, | Hovey Avenue, . . . | 3-in. |
| Houghton, Mifflin & Co., . . . | Albro & Blackstone Streets, | 6-in. |
| " " " . . . | River Street, . . . | 6-in. |
| Irving & Casson, . . . | Otis Street, . . . | 6-in. |
| " " . . . | Thorndike Street, . . . | Two 6-in. |
| " " . . . | Thorndike Street, . . . | 2-in. |
| Ivers & Pond Piano Co., . . . | Albany Street, . . . | 4-in. & 6-in. |
| Keeler & Co., . . . | Thorndike Street, . . . | 1-in. |
| Kendall, Edward, & Sons, . . . | Main Street, . . . | 2-in. |
| Lamb & Ritchie, . . . | Albany Street, . . . | 6-in. |
| Lever Bros. Co., . . . | Broadway, . . . | 6-in. |
| " " " . . . | Broadway, . . . | 8-in. |
| Little, Brown & Co., . . . | Putnam Avenue, . . . | 6-in. |
| Lockhart, Wm. L., & Co., . . . | First Street, . . . | 6-in. |
| Luke, E. H., Estate of, . . . | Main Street, . . . | 2-in. |
| Mason & Hamlin Co., . . . | Broadway, . . . | Two 6-in. |
| McLean, Isaac, . . . | Mt. Auburn Street, . . . | 4-in. |
| Metropolitan Storage Warehouse Co., | Massachusetts Avenue, . . | 6-in. |
| Middlesex C'ty, House of Correction, | Second & Spring Streets, . | 6-in. |
| National Biscuit Co., . . . | Franklin Street, . . . | 4-in. |
| " " " . . . | Franklin Street, . . . | 6-in. |
| " " " . . . | Green Street, . . . | 8-in. |
| National Linseed Oil Co., . . . | Fifth Street, . . . | 6-in. |
| North Packing & Provision Co., . . | Winsor Street, . . . | 6-in. |
| O'Brien, John (Rev.), . . . | Seventh Street, . . . | 4-in. |
| Page, Geo. G., Box Co., . . . | Hampshire Street, . . . | Two 6-in. |
| Petterson, Oscar G., . . . | 483 Main Street, . . . | 4-in. |
| Pierce, Thomas, Trustees of Estate of, | Broadway, . . . | 6-in. & 4-in. |
| Pi Eta Club, . . . | Winthrop Street, . . . | 2-in. |
| Porter, Henry S., . . . | Kinnaird Street, . . . | 4-in. |
| Reardon, John, & Sons, Corporation, | Waverly Street, . . . | 4-in. |
| Reardon, William, . . . | Portland Street, . . . | 2-in. |
| Revere Sugar Refinery, . . . | Water Street, . . . | 6-in. |
| Reversible Collar Co., . . . | Putnam Avenue, . . . | 6-in. |
| Russell, Lucy J., . . . | 29 Elm Street, . . . | 1-1-2-in. |
| Rice, P. G., & Co., . . . | Massachusetts Ave. & Lee St., | Two 2-in. |
| Sawyer, Howard M., & Son, . . . | Thorndike Street, . . . | 4-in. |
| " " " " . . . | Second Street, . . . | 6-in. |
| Seavey Manufacturing Co., . . . | Third Street, . . . | 6-in. |
| Seelye Manufacturing Co., . . . | First Street, . . . | 4-in. |

| | | |
|--------------------------|-------------------------------|------|
| Amesbury Electrical Co. | Auburn Street. | 2 in |
| " | Auburn Street. | 6 in |
| " | Franklin Street. | 6 in |
| Amesbury Electric Co. | Broadway. | 2 in |
| Amesbury Electric Co. | Hampshire Street. | 6 in |
| Amesbury Electric Co. | Hogers Street. | 6 in |
| " | High Street. | 6 in |
| Amesbury Electric Co. | Pattee Street. | 6 in |
| Amesbury Electric Works. | Main Street. | 2 in |
| Amesbury Electric Co. | Broadway. | 6 in |
| Amesbury Electric Co. | Broadway. | 6 in |
| Amesbury Electric Co. | London Street. | 6 in |
| " | Massachusetts Avenue | 6 in |
| Amesbury Electric Co. | Nottingham Place. | 6 in |
| Amesbury Electric Co. | Claverly Hall, Mt. Auburn St. | 6 in |
| Amesbury Electric Co. | Albany Street. | 6 in |

DRINKING FOUNTAINS

The number of drinking fountains and troughs remains unchanged, as follows:

Of the above number, four are of the Jenks manufacture and are water drinking fountains. These were supplied with ice at an expense of the Water Department, from June 25th to October 17th, inclusive, as follows:

| | |
|---------------------------|----------|
| Central Square fountain. | \$112.50 |
| East Cambridge fountain. | 145.00 |
| Harvard Square fountain. | 105.00 |
| North Cambridge fountain. | 50.75 |
| | \$413.25 |

Average cost per day of supplying ice 97 days for these fountains was per fountain, \$4.26.

In response to the calling the department's attention to acts of 1902 of the State Board of State Board of Agriculture, the fountains and troughs have been carefully watched and cleaned, in order, if possible, to suppress the contagion of the disease of glanders, which has been more or less prevalent in some sections of the State during the past year.

In the early part of the year the fountains, for a short time were closed for this reason.

In all sections of the City the fountains have been painted and the work repairs that were necessary were made.

STREET WATERING STANDPIPES.

Sixty-five (65) street watering standpipes are in use at this date, November 30, 1904.

There have been two additions made during the year, one at the corner of Norfolk and Washington Streets, and one on Erie Street, near Brookline Street.

At the corner of Broadway and Sixth Street a new standpipe has been set to replace one removed, which was broken by a team.

The Street Department, as in former years, has reimbursed this department for the expense incurred by repairs on these watering standpipes.

GATES.

Twenty-three (23) new gates have been set during the year (see recapitulation table on pages 66 and 67).

Nine (9) have been set on renewals of main pipe.

Four (4) have been set on new mains (extensions).

Nine (9) have been set on supplies.

One (1) has been set in place of broken, removed.

In nineteen (19) cases the gates have received repairs, made necessary by leaking, etc.

The annual inspection of gates has shown that they are in first-class condition.

Their locations have been carefully marked.

BOXES.

There have been eighty-one (81) boxes set during the year.

Seventeen (17) iron boxes, four (4) small wooden boxes, and one (1) hydrant box have been set on extensions and renewal of main pipes.

Fourteen (14) special boxes have been set on meters.

Eighteen (18) iron boxes have been set on supply work.

One (1) hydrant box, two (2) wooden boxes, and twenty-four (24) iron boxes have been set on worthless ones removed.

The gate boxes in all parts of the City have been inspected, and raised, lowered or repaired, as the change in grade of street has required. In cases where they have been affected by frost they have received the necessary care.

HYDRANTS

There are one thousand eighteen (1,018) hydrants in use at this date,
November 30, 1904

| | |
|----------|-------|
| Boston | 136 |
| Chapman | 542 |
| Coffin | 41 |
| Finch | 98 |
| Holbrook | 90 |
| Perkins | 91 |
| | <hr/> |
| | 1,018 |

Twenty-three (23) hydrants have been set during the year, i. e., four
new in new locations, and nineteen (19) in place of old or broken
hydrants removed.

See page 57 for locations of this new work and changes.

Hydrants have been removed from the following streets:

Beachway at Elm Street

Beachway at Davis Street

Cambridge Street at Harding Street

Central Avenue at Madison Street

Deane Street at Brookline Street

Green Street at Vernon Street

Hill Street at local.

Kirkland Street at Quincy Street

N. of Main Street

N. of Main Street

Magazine Street at Park Street

Magazine Street at Upton Street

Pearson Street at Park Street

Pearson Street at Upton Street

Rice Street

Hydrants have been removed from the following streets:

Bridge Street near French Point Street Boston

Cambridge Street at Madison Street Boston

Central Street Coffin

Central Road at Walnut Avenue Boston

Washington Avenue near Upland Road Hingham

In the following named streets the hydrants have been repaired:—

Antrim Street.

Austin Street at Essex Street.

Banks Street at Mt. Auburn Street.

Blanche Street at Massachusetts Avenue.

Bow Street at Linden Street.

Brookline Street at Green Street.

Chestnut Street at Whitney Avenue.

Cambridge Street at Elm Street.

Distillhouse Street.

Hampshire Street at Amory Street.

Harvard Street at Main Street.

Harvard Street at Prospect Street.

Harvard Street at Winsor Street.

Kenwood Street at Putnam Avenue.

Leonard Avenue.

Mechanics Square.

Norris Street.

Scott Street.

Tannery Street.

Trowbridge Street.

Waterhouse Street.

In Van Norden Street the hydrant has been lowered to accomodate the Street Department.

In Concord Avenue the hydrant at corner of Madison Street has been relocated.

On the premises of the George G. Page Box Company the hydrant has been changed, at the expense of the company.

There have been three new post hydrants set in Harvard University grounds; these are the property of the University and at its expense were set by this department, when the work of laying the new six-inch supply main in the grounds was in process.

METERS.

During the year there have been three hundred sixty-three (363) meters set in locations not covered by meter at this time last year; their kind, sizes and numbers are found in the the table following:—

| NO. | NAME | AGE | SEX | REL. | EDUC. | IND. | TOTAL |
|-----|------|-----|-----|------|-------|------|-------|
| 1 | ... | ... | ... | ... | ... | ... | ... |
| 2 | ... | ... | ... | ... | ... | ... | ... |
| 3 | ... | ... | ... | ... | ... | ... | ... |
| 4 | ... | ... | ... | ... | ... | ... | ... |
| 5 | ... | ... | ... | ... | ... | ... | ... |
| 6 | ... | ... | ... | ... | ... | ... | ... |
| 7 | ... | ... | ... | ... | ... | ... | ... |
| 8 | ... | ... | ... | ... | ... | ... | ... |
| 9 | ... | ... | ... | ... | ... | ... | ... |
| 10 | ... | ... | ... | ... | ... | ... | ... |

...

| NO. | NAME | AGE | SEX | REL. | EDUC. | IND. | TOTAL |
|-----|------|-----|-----|------|-------|------|-------|
| 11 | ... | ... | ... | ... | ... | ... | ... |
| 12 | ... | ... | ... | ... | ... | ... | ... |
| 13 | ... | ... | ... | ... | ... | ... | ... |
| 14 | ... | ... | ... | ... | ... | ... | ... |
| 15 | ... | ... | ... | ... | ... | ... | ... |
| 16 | ... | ... | ... | ... | ... | ... | ... |
| 17 | ... | ... | ... | ... | ... | ... | ... |
| 18 | ... | ... | ... | ... | ... | ... | ... |
| 19 | ... | ... | ... | ... | ... | ... | ... |
| 20 | ... | ... | ... | ... | ... | ... | ... |

...

...

| NO. | NAME | AGE | SEX | REL. | EDUC. | IND. | TOTAL |
|-----|------|-----|-----|------|-------|------|-------|
| 21 | ... | ... | ... | ... | ... | ... | ... |
| 22 | ... | ... | ... | ... | ... | ... | ... |
| 23 | ... | ... | ... | ... | ... | ... | ... |
| 24 | ... | ... | ... | ... | ... | ... | ... |
| 25 | ... | ... | ... | ... | ... | ... | ... |
| 26 | ... | ... | ... | ... | ... | ... | ... |
| 27 | ... | ... | ... | ... | ... | ... | ... |
| 28 | ... | ... | ... | ... | ... | ... | ... |
| 29 | ... | ... | ... | ... | ... | ... | ... |
| 30 | ... | ... | ... | ... | ... | ... | ... |

STONY BROOK PIPE LINE.

The only repair required on this line during the year has been one small leak at Arlington Street, Watertown.

The reading of the Venturi meter has been taken at frequent intervals and shows that the discharge from this main has been kept at least as high as it has been for some years past.

The gates at the Pond have been closed twice each day and the air removed from the pipe.

The air ejectors have been in constant operation.

STONY BROOK.

Two new cesspools have been constructed during this year.

One vault has been discontinued and one house has been connected with cesspool previously built, making twenty-three cesspools and eighteen vaults to be cared for.

A new set of screens has been made for the gate house which will add much to the facility of cleaning.

The stone work of the gate house should be thoroughly repointed and a new granolithic walk put down around the same this year.

HOBBS BROOK.

The water in this basin has not been down below grade 178.50 during the year and has continued to be of the best quality.

The standing grass not needed has been sold to the highest bidder.

The bushes and weeds along the highways around the basin have been cut and the grass on the dams kept mowed.

RECAPITULATION.

NEW SUPPLIES.

| | 6
Inch | 4
Inch | 2
Inch | 1½
Inch | 1¼
Inch | 1
Inch | ¾
Inch | Total |
|---------------------------------------|-----------|-----------|-----------|------------|------------|-----------|-----------|--------|
| Length, in feet, of pipe. | 1,040 | 289½ | 559½ | 39 | 387 | 502½ | 2,919 | 5,736½ |
| Number of supplies..... | 1 | 6 | 8 | 1 | 7 | 14 | 74 | 111 |
| Number of stop and waste valves | | 4 | 6 | 1 | 7 | 13 | 74 | 105 |
| Number of screw cocks..... | | | 6 | 1 | 9 | 14 | 73 | 103 |
| Number of sidewalk cocks..... | | | | | 7 | 14 | 73 | 94 |
| Number of service boxes | | | | | | | | 94 |
| Number of gates | 3 | 6 | | | | | | 9 |
| Number of gate boxes..... | | | | | | | | 18 |

MAIN PIPE

| | 24 | 22 | 18 | 16 | 14 | 12 | 10 | 8 | 6 | 4 | 2 | Total |
|---------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| | feet | feet | feet | feet | feet | feet | feet | feet | feet | feet | feet | |
| Length of pipe at present | 124 | 1 | 100 | | 125 | 1 | 100 | 0 | 100 | 0 | 0 | 1,010 |
| Length of pipe removed | | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total length of pipe | 124 | 1 | 100 | 0 | 125 | 1 | 100 | 0 | 100 | 0 | 0 | 1,010 |
| Number of pipes | | 1 | | | | 1 | | 1 | | | | 3 |
| Number of joints | | | | | | | | | | | | 0 |

TABLE NO. 10. NUMBER OF GALLONS, BY THE MONTH, FLOWING OVER THE WATERWAY AT STONY BROOK RAILROAD

| | Gallons | Number of days | | Gallons | Number of days |
|-----------|---------------|----------------|-----------|---------------|----------------|
| 1900 | | | May | 1,000,000 | 31 |
| June | 10,000,000 | 30 | June | 10,000,000 | 31 |
| July | | | July | 1,000,000 | 31 |
| August | | | August | | |
| September | 1,000,000 | 0 | September | 10,000,000 | 30 |
| October | 1,000,000 | 30 | October | 1,000,000 | 31 |
| November | 1,000,000 | 30 | November | 1,000,000 | 30 |
| December | 1,000,000 | 31 | | | |
| Total | 1,000,000,000 | 30 | | 1,000,000,000 | 171 |

Total amount wasted 1,000,000,000 gallons
 Total number of days in which water wasted 171

HOBBS BROOK.

| STONY BROOK. | | | | LINCOLN STREET.
Basin No. 1. | | | | WINTER STREET.
Basin No. 2. | | | | REMARKS. |
|--------------------------------|-------|---------------------------------|------------|---------------------------------|--------|---------------------------------|------------|--------------------------------|--------|---------------------------------|--------|---|
| Lowest elevation during month. | | Highest elevation during month. | Rain-fall. | Lowest elevation during month. | | Highest elevation during month. | Rain-fall. | Lowest elevation during month. | | Highest elevation during month. | | |
| 1903. | | | | | | | | | | | | |
| Dec. 1 | 80.23 | | 2.59 | Dec. 9 | 180.70 | | 2.45 | Dec. 9 | 180.58 | | 181.07 | 1903.
Dec. 10. Set first flash-board. |
| Dec. 14 | ..... | 81.15 | ..... | Dec. 31 | ..... | 181.10 | ..... | Dec. 31 | ..... | ..... | ..... |  |
| 1904. | | | | | | | | | | | | |
| Jan. 13 | 80.08 | | 4.46 | Jan. 1 | 181.10 | | 3.01 | Jan. 1 | 181.07 | | | 1904
Jan. 4. Removed first flash-board. |
| Jan. 24 | ..... | 81.19 | ..... | Jan. 25 | ..... | 181.37 | ..... | Jan. 25 | ..... | ..... | 181.32 | Jan. 7. Set first flash-board. |
| Feb. 14 | 81.02 | ..... | 3.08 | Feb. 16 | 181.30 | ..... | 2.10 | Feb. 16 | 181.25 | ..... | ..... |  |
| Feb. 23 | ..... | 81.48 | ..... | Feb. 29 | ..... | 181.42 | ..... | Feb. 29 | ..... | ..... | 181.37 | |
| Mar. 3 | 81.29 | ..... | 2.60 | Mar. 6 | 181.40 | ..... | 2.50 | Mar. 1 | 181.37 | ..... | ..... |  |
| Mar. 9 | ..... | 82.29 | ..... | Mar. 26 | ..... | 181.70 | ..... | Mar. 26 | ..... | ..... | 181.65 | |
| Apr. 27 | 81.40 | ..... | 9.48 | Apr. 26 | 181.40 | ..... | 7.60 | Apr. 27 | 181.37 | ..... | ..... |  |
| Apr. 30 | ..... | 83.04 | ..... | Apr. 30 | ..... | 182.05 | ..... | Apr. 30 | ..... | ..... | 182.00 | |
| May 30 | 81.33 | ..... | 2.51 | May 26 | 181.38 | ..... | 4.05 | May 27 | 181.33 | ..... | ..... |  |
| May 1 | ..... | 82.75 | ..... | May 1 | ..... | 181.95 | ..... | May 1 | ..... | ..... | 181.90 | |
| June 26 | 80.92 | ..... | 2.64 | June 25 | 181.20 | ..... | 3.18 | June 25 | 181.15 | ..... | ..... |  |
| June 8 | ..... | 81.42 | ..... | June 9 | ..... | 181.45 | ..... | June 9 | ..... | ..... | 181.40 | |
| July 17 | 79.79 | ..... | 2.01 | July 31 | 180.70 | ..... | 2.35 | July 31 | 180.55 | ..... | ..... |  |
| July 2 | | 81.10 | | July 1 | | 181.30 | | July 1 | | | 181.25 | July 16. Removed first flash-board.
July 23. Removed second flash-board.
July 26. Removed third flash-board.
July 30. Removed fourth flash-board.
Aug. 25. Removed fifth flash-board.
Aug. 26. Removed sixth flash-board.
Aug. 27. Removed seventh flash-board.
Sept. 4. Removed eighth flash-board.
Sept. 5. Removed ninth flash-board.
Sept. 10. Removed tenth flash-board.
Sept. 15. Set tenth flash-board.
Sept. 16. Set ninth flash-board.
Sept. 16. Set eighth flash-board.
Sept. 16. Set seventh flash-board.
Sept. 27. Removed seventh flash-board.
Sept. 28. Removed eighth flash-board.
Sept. 28. Removed ninth flash-board.
Oct. 1. Set ninth and eighth flash-boards.
Oct. 4. Removed eighth and ninth flash-boards.
Oct. 7. Removed tenth flash-board.
Oct. 13. Set tenth flash-board.
Oct. 17. Removed tenth flash-board.
Oct. 21. Set tenth flash-board.
Oct. 25. Removed tenth flash-board.
Nov. 2. Removed eleventh flash-board.
Nov. 5. Removed twelfth flash-board. |
| Aug. 27 | 79.98 | ..... | 2.87 | Aug. 31 | 180.40 | ..... | 3.60 | Aug. 31 | 179.75 | ..... | ..... |  |
| Aug. 5 | ..... | 80.75 | ..... | Aug. 3 | ..... | 180.65 | ..... | Aug. 3 | ..... | ..... | 180.55 | |
| Sept. 29 | 79.81 | ..... | 5.70 | Sept. 14 | 180.15 | ..... | 5.87 | Sept. 14 | 179.15 | ..... | ..... |  |
| Sept. 16 | ..... | 81.46 | ..... | Sept. 16 | ..... | 180.65 | ..... | Sept. 1 | ..... | ..... | 179.70 | |
| 1905. | | | | | | | | | | | | |
| Oct. 26 | 79.98 | ..... | 1.67 | Oct. 10 | 180.45 | ..... | 1.73 | Oct. 31 | 178.95 | ..... | ..... |  |
| Oct. 2 | ..... | 80.83 | ..... | Oct. 14 | ..... | 180.55 | ..... | Oct. 1 | ..... | ..... | 179.50 | |
| 1906. | | | | | | | | | | | | |
| Nov. 2 | 80.00 | ..... | 1.57 | Nov. 9 | 180.48 | ..... | 1.51 | Nov. 13 | 178.50 | ..... | ..... |  |
| Nov. 17 | ..... | 81.04 | ..... | Nov. 19 | ..... | 180.60 | ..... | Nov. 1 | ..... | ..... | 178.92 | |
| | | | 61.18 | | | | 39.05 | | | | | |

COMPARATIVE TRUCKING FOR THE LAST TEN YEARS

| | Expenditure | Revenue | Supply | Total Feet | Net |
|------|-------------|---------|--------|------------|------|
| 1880 | 15,000 | 12,000 | 27,000 | 60,000 | 0.5 |
| 1881 | 17,000 | 20,000 | 17,000 | 61,000 | 11.5 |
| 1882 | 17,000 | 20,000 | 10,000 | 62,000 | 12.0 |
| 1883 | 17,000 | 20,000 | 12,000 | 62,000 | 9.5 |
| 1884 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1885 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1886 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1887 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1888 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1889 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1890 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |
| 1891 | 18,000 | 20,000 | 12,000 | 62,000 | 0.0 |

SUMMARY OF STATISTICS

FOR THE YEAR ENDING NOVEMBER 30, 1904.

In form recommended by the New England Water Works Association

CAMBRIDGE WATER WORKS.

CITY OF CAMBRIDGE, COUNTY OF MIDDLESEX, STATE OF MASSACHUSETTS.

GENERAL STATISTICS.

Population by census of 1900 — 91,886.

Date of construction — 1855.

By whom owned — City of Cambridge.

Source of supply — Hobbs Brook and Stony Brook in Lincoln, Waltham and Weston, and Fresh Pond in Cambridge.

Mode of supply (whether gravity or pumping) — Gravity from Hobbs and Stony Brooks to Fresh Pond, pumping from Fresh Pond to Payson Park Reservoirs, thence by gravity to consumers.

PUMPING STATISTICS.

1. Builders of pumping machinery — One Leavitt built by Groshon High Duty Pumping Engine Company; two Worthington; one Blake.

2. Description of fuel used — *a.* Kind — bituminous.

b. Brand of coal — Cumberland and New River.

c. Price of coal per gross ton — delivered from December, 1903, to November 30, 1904, \$4.20.

3*a.* Coal consumed for the year — 3,650,513 lbs.

3*b.* Coal consumed for pumping purposes only — 3,601,040 lbs.

4. (Pounds of wood consumed) \div 3 = equivalent amount of coal, 500 lbs.

5. Total equivalent coal consumed for the year = (3*b*) + (4), 3,601,540 lbs.

| | Gallons |
|--|---------------|
| 6a Total pumpage for the year without allowance for slip | 2,831,342.145 |
| 6b Total amount purchased from Metropolitan Water and Sewerage Board | 3,900,000 |
| 6c Total consumption for the year | 3,210,942.145 |
| 7 Average static head against which pumps work | 138.03 feet |
| 8 Average dynamic head against which pumps work | 194.14 feet |
| 9 Number of gallons pumped per pound of equivalent coal | 1.46 |
| 10 Total gallons pumped in the 100 days test in 1904 | 1,407,431.4 |
| 11 Total fuel consumed 360,134 lbs. | |
| 12 Cost of pumping, figured on pumping station expenses, viz \$17,208.10 | |
| 13 Per million gallons pumped | \$6.11 |
| 14 Per million gallons raised one foot dynamic | 0.11 |
| 15 The following figures were run in tests during year | |

FINANCIAL STATISTICS FOR 1904

| | | |
|---------------------|------------|--------------|
| Operating expenses | \$1,536.33 | |
| Depreciation | 142,183.02 | |
| Amortization | 3,917.88 | |
| Interest on account | 2,000.00 | |
| | | \$149,637.23 |

EXPENDITURES

| For Maintenance | | Operating Expenses |
|----------------------------------|-------------|--------------------|
| General expenses | \$21,025.92 | \$21,025.92 |
| Supplies expense | 37,377.38 | |
| Salaries | 9,463.50 | 9,463.50 |
| Salaries, pumping | 7,009.25 | 7,009.25 |
| Pumping, general | 10,508.94 | 10,508.94 |
| Franklin Park Reservoir | 784.33 | 784.33 |
| Franklin Park Reservoir, general | 9,000.00 | 2,700.00 |
| Franklin Park Reservoir, grading | 12,500.00 | |
| Hudson River Reservoir | 1,408.04 | 1,408.04 |
| Amounts carried forward | \$70,187.09 | \$32,591.26 |

| | | | | | | |
|---|---|---|---|---|---------------------|--------------------|
| <i>Amounts brought forward,</i> | . | . | . | . | \$79,185 09 | \$56,380 58 |
| Stony Brook Reservoir | . | . | . | . | 2,999 96 | 2,999 96 |
| Ice for fountains | . | . | . | . | 460 35 | |
| Rent | . | . | . | . | 1,200 00 | 1,200 00 |
| Metropolitan water | . | . | . | . | 14,000 00 | |
| | | | | | <u>\$97,845 40</u> | <u>\$60,580 54</u> |
| Interest on bonds | . | . | . | . | 126,126 50 | |
| | | | | | <u>\$223,971 90</u> | |
| Sinking Fund | . | . | . | . | 121,522 50 | |
| | | | | | <u>\$345,494 40</u> | |
| Refunds and abatements | . | . | . | . | 7,291 63 | |
| | | | | | <u>\$352,786 03</u> | |
| (Transferred to Construction account,
\$7,059.28.) | | | | | | |

Construction :

| | | | | | | |
|-------------------------------|---|---|---|---|--------------------|---------------------|
| General | . | . | . | . | \$13,600 99 | |
| Hobbs Brook land | . | . | . | . | 221 00 | |
| Hobbs Brook, general | . | . | . | . | 76 84 | |
| City Solicitor | . | . | . | . | 500 00 | |
| Stony Brook Main | . | . | . | . | 3,454 03 | |
| Meters | . | . | . | . | 3,999 12 | |
| | | | | | <u>21,851 98</u> | |
| | | | | | | <u>\$374,638 01</u> |
| Net cost of works to date | . | . | . | . | \$5,772,507 13 | |
| Bonded debt at date | . | . | . | . | 3,350,600 00 | |
| Value of Sinking Fund at date | . | . | . | . | 1,218,686 74 | |
| Average rate of interest | . | . | . | . | 3½ and 4 per cent. | |

STATISTICS OF CONSUMPTION OF WATER.

1. Estimated total population at date — 97,826.
2. Estimated population on lines of pipe — 97,826.
3. Estimated population supplied — 97,826.

4. Total pumping for year — 2,811,342,145 gallons
5. Water purchased from Metropolitan Water and Sewerage Board 7,660,000 gallons
6. Total consumption for the year — 3,210,982,145 gallons
7. Passed through meters — 1,143,793,500 gallons
8. Percentage of consumption metered — 35.6 per cent
9. Average daily consumption — 8,773,175 gallons
10. Gallons per day to each inhabitant — 89.62
11. Gallons per day to each consumer — 89.68
12. Gallons per day to each tap, 50.1
13. Cost of supplying water, per million gallons pumped, figured on basis of maintenance & operating expenses, \$21.30
14. Total cost of supplying water, per million gallons pumped, figured on basis of maintenance & interest on bonds, \$65.45

STATISTICS RELATING TO DISTRIBUTION SYSTEM

MAINS

Kind of pipe — cast iron

Size — From 2 inch to 40 inch

Installed — 1,411½ feet during year

Retained — 3,763 feet during year

Total now in use — 115.62 miles

Number of leaks per mile — 17

Length of pipes 2 and 3 inches diameter — 2 miles

Number of hydrants added during year public — 13

Number of hydrants public now in use — 1,018

Number of stop gates added during year — 23

Number of stop gates smaller than 6 inch — none

Range of pressure on mains — 45 lbs. to 55 lbs.

BRANCHES

Kind of pipe — galvanized iron

Size — Three-fourth inch to two inches of galvanized pipe — 1,000

6 inch, 8 inch and 9 inch of cast iron pipe

Installed — 3,734½ feet

Estimated total now in use — 115.16 miles

Number of s

Number now

Average leng

Average cost

Number of n

Number now

Percentage o

The following statement is from the report of the Commissioners of the Sinking Fund of the City of Cambridge, and shows the present condition of the Water Loan Sinking Fund

| In | | |
|---|--------------|----------------|
| The amount of the Fund November 30, 1903, was | | \$1,022,471 06 |
| The amount received from the City Treasury of Cambridge being the annual requirements for 1904 derived from Water Rates was | 171,27 30 | |
| Interest received on invested funds | 24,737 27 | |
| Profits received on bonds purchased for investment | 200 00 | |
| | | \$1,218,681 33 |
| Out | | |
| Paid accrued interest on investments purchased | \$2,107 05 | |
| Paid premiums on investments purchased | 2,241 74 | |
| Leaving the amount of the fund November 30, 1904 | 1,214,332 54 | \$1,214,332 54 |

The total Water Debt, which the foregoing Fund is to pay, is as follows:

| | | |
|---------------------------|-------|----------------|
| Nov 1, 1900 | 11 25 | \$41,000 00 |
| Nov 1, 1901 | do | 30,000 00 |
| Nov 1, 1902 | do | 22,000 00 |
| July 1, 1903 | do | 64,000 00 |
| Aug 1, 1903 | do | 22,000 00 |
| Dec 1, 1903 | do | 22,000 00 |
| Mar 1, 1904 | do | 204,000 00 |
| June 1, 1904 | do | 22,000 00 |
| Sept 1, 1904 | do | 122,000 00 |
| Jan 1, 1905 | do | 26,000 00 |
| Apr 1, 1905 | do | 22,000 00 |
| Jan 1, 1906 | do | 120,000 00 |
| Mar 1, 1906 | do | 22,000 00 |
| Nov 1, 1906 | do | 62,000 00 |
| Feb 1, 1907 | do | 100,000 00 |
| Aug 1, 1907 | do | 22,000 00 |
| Apr 1, 1908 | do | 200,000 00 |
| Aug 1, 1908 | do | 202,000 00 |
| Apr 1, 1909 | do | 100,000 00 |
| July 1, 1909 | do | 200,000 00 |
| Aug 1, 1909 | do | 100,000 00 |
| Nov 1, 1909 | do | 202,000 00 |
| Apr 1, 1910 | 11 25 | 20,000 00 |
| July 1, 1910 | 11 25 | 100,000 00 |
| Nov 1, 1910 | 11 25 | 22,000 00 |
| Amount reserved for water | | \$2,400,000 00 |

Amount brought

.
.
.
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.
.
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.
.

————— \$3,280,800 00

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City of Cambridge
Massachusetts

ANNUAL REPORT

OF THE

WATER BOARD

FOR THE

YEAR ENDING NOVEMBER 30, 1905

PRINTED FOR THE DEPARTMENT

173072

CAMBRIDGE WATER BOARD

1906

President

WILLIAM B. DURANT

Members of the Board

| | |
|--------------------------|--------------------------|
| GEORGE H. HOWARD | Term expires 1905 |
| WILLIAM B. DURANT | Term expires 1906 |
| ANDREW J. RADY | Term expires 1907 |
| JOHN P. O'BRIEN | Term expires 1908 |
| EDMUND H. STEVENS | Term expires 1909 |

WALTER H. HARDING, Clerk

Superintendent of Works

EDWIN C. BROOKS

Water Registrar

WALTER H. HARDING

CAMBRIDGE WATER BOARD

Date of election and length of service of members, 1865-1905.

| | | | | |
|---------------------|---|---|-------------|------------------|
| CHESTER W. KINGSLEY | . | . | 1865-1894 | |
| JOHN SARGENT | . | . | 1865-1871 | |
| A. K. P. WELCH | . | . | 1865-1871 | |
| ROBERT DOUGLASS | . | . | 1865-1871 | |
| SAMUEL SLOCOMB | . | . | 1865-1876 | |
| Z. L. RAYMOND | . | . | 1871 | |
| HENRY L. EUSTIS | . | . | 1871-1885 | |
| J. WARREN MERRILL | . | . | 1871-1881 | |
| GEORGE P. CARTER | . | . | 1871-1883 | |
| JOHN H. LEIGHTON | . | . | 1876-1879 | |
| KNOWLTON S. CHAFFEE | . | . | 1879-1889 | |
| JAMES M. W. HALL | . | . | 1881-1899 | |
| LEANDER M. HANNUM | . | . | { 1883-1884 | |
| | | | { 1885-1893 | |
| JOHN F. O'BRIEN | . | . | 1884-1895 | |
| GEORGE H. HOWARD | . | . | 1889- | (Now in Office.) |
| E. BURT PHILLIPS | . | . | 1893-1896 | |
| FRANK A. ALLEN | . | . | 1895-1899 | |
| STILLMAN F. KELLEY | . | . | 1894-1903 | |
| WELLINGTON FILLMORE | . | . | 1896-1903 | |
| EDMUND H. STEVENS | . | . | 1899- | (Now in Office.) |
| WILLIAM B. DURANT | . | . | 1899- | (Now in Office.) |
| ANDREW J. RADY | . | . | 1903- | (Now in Office.) |
| JOHN F. O'BRIEN | . | . | 1903- | (Now in Office.) |

Presidents of the Board

| | | | |
|---------------------|---|---|-----------|
| J. WARREN MERRILL | . | . | 1865-1867 |
| EZRA PARMENTER | . | . | 1867 |
| JOHN SARGENT | . | . | 1867-1871 |
| J. WARREN MERRILL | . | . | 1871-1873 |
| CHESTER W. KINGSLEY | . | . | 1873-1876 |
| GEORGE P. CARTER | . | . | 1876-1883 |
| CHESTER W. KINGSLEY | . | . | 1883-1894 |
| JAMES M. W. HALL | . | . | 1894-1899 |
| WILLIAM B. DURANT | . | . | 1899- |

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

REPORT OF THE CAMBRIDGE WATER BOARD

December 19, 1905

To the Honorable, the City Council of the City of Cambridge

The forty-first annual report of the Cambridge Water Board, for the year ending November 30, 1905, is submitted for your consideration.

The different reservoirs, and other works under the charge of the Board, are in better condition than they were one year ago, inasmuch as a section of the new pipe line has been successfully constructed, and good progress has been made in the improvement of Kingsley Park. Much, however, remains to be done, if needed improvements are to be carried out.

The water supplied to the water takers is still of good quality, and compares favorably with the average surface waters supplied to other municipalities of the Commonwealth.

We regret to report that the pending suit of John C. Gray and others against the City of Cambridge has been decided by the Supreme Judicial Court in favor of the plaintiffs. This was a bill praying for an injunction against the continued use by the City of a portion of its distribution pipes which originally supplied water to the old reservoir on Highland Street, and extend across private land now owned or controlled by the plaintiffs. These pipes were laid under grants in deeds from the former proprietors of the soil, made many years ago, the earliest dated May 3, 1836, and in these deeds the exact interest thereby conveyed in the land in question was left a matter of some doubt, but it was therein stated in substance that the purpose of the grant was to conduct water from Fresh Pond to the Reservoir, and the contention of the plaintiffs was that the Reservoir having been removed and the site sold, the rights conveyed by the deeds expired or reverted to the owners of the soil, although for more than twenty years water had not only been conducted to the Reservoir, but distributed through the same pipes to different parts of the City. This contention was finally sustained by the full bench of the Supreme

Judicial Court, and consequently the City will be obliged to discontinue the use of the pipes. This will involve the laying of new pipes in Huron Avenue and Reservoir Street at an expense of about \$12,000.

TUNNELS UNDER BROAD CANAL AT FIRST, THIRD AND SIXTH STREETS.

The pipes under Broad Canal at First, Third and Sixth Streets are now smaller than is desirable and have been broken several times by vessels passing over them, and by dredgers.

By the terms of the Charles River Dam Act, these pipes are to be lowered by the Charles River Dam Commission. In view of the injury by electrolysis to submerged water pipes, and owing to the desirability of getting at the pipes at any time for repairs, and as a matter of safety, it would seem very desirable that these pipes should be enclosed in tunnels under the canal. This is the recent practice in nearly, if not all, the cities.

The Gas Company is anxious to co-operate with the Water Department in the construction and use of these tunnels, and we would recommend that early action be taken in this matter.

The total cost of these tunnels at the three points has been estimated at about \$17,000; part of this, nearly \$5,000, would be borne by the Charles River Dam Commission, and nearly if not quite an equal amount by the Gas Company, leaving probably less than \$7,000 to be borne by the City.

FINANCIAL STATEMENT IN BRIEF.

| | |
|---|-----------------------|
| The total cost of the Water Works to November 30, 1904, was | \$5,772,507 13 |
| There was expended during the year on Construction Account | 251,232 57 |
| So that the total cost to November 30, 1905, was | <u>\$6,023,739 70</u> |
| The Construction Account for the year 1904, was | \$21,851 98 |
| An increase of | 229,380 59 |
| | <u>\$251,232 57</u> |

This increase is, of course, mainly due to the construction of a section of the new pipe line.

WATER BOND ACCOUNT.

| | |
|---|------------------------------|
| The whole number of bonds outstanding is | \$3,646,000 00 |
| Deducting from this sum the present value of the Water Debt | |
| Sinking Fund, exclusive of the note of the City for \$200,000 | 1,382,828 84 |
| Leaves as the net Water Debt | <u><u>\$2,263,771 16</u></u> |

For further details of the financial condition of the Department, the City Council is referred to the statement of the Registrar appended to this report. From that statement it appears that the excess of expenditures over receipts during the past year is the sum of \$6,176.93. This deficit was caused by the purchase of water from the Metropolitan Water and Sewerage Board, on two different occasions, at a cost of \$28,424.24, this sum being charged to Water Works Maintenance Account, and met, except to the extent of this deficit which had to be carried over, by the payments of water rates. It is hoped that the deficit will be made up during the coming year. At all events, there can be no more deficit arising from a similar cause, as no more water can be purchased from the Metropolitan Board without a special act of the Legislature.

WATER BASINS

In Hobbs Brook Reservoir the water is about two feet below the dam, and at Stony Brook about six inches below, that is, they are both nearly full, and this, in view of the dryness of the season, is a subject of congratulation. Fresh Pond stands now at grade 12.90 feet, which is a gain of nearly one foot in height since the water was let on through the new pipe. When the Pond is full, it stands at grade 16.45 feet above the City base (which is twenty feet below the coping of the Dry Dock at Charlestown Navy Yard). It is expected that the Pond will be filled on or before May 1st, next.

NEW PIPE LINE

In April last the City Council made an appropriation of \$220,000, for the purpose of constructing a section of the new pipe line, to connect with the old thirty-inch iron pipe at Irving Street, Watertown, and from thence to conduct the water delivered from the thirty-inch pipe through a new conduit sixty-three inches in diameter to Fresh Pond. The iron pipe which conducted the water from Stony Brook Reservoir to Fresh Pond is about eight miles in length, is thirty-six inches in diameter from Stony Brook Reservoir for a distance of one mile, and then for the remaining seven miles is thirty inches in diameter. This pipe was laid in 1887 and has therefore been in service about eighteen years. It is now particularly covered with tubercles on the inside, and the flow of water is very much retarded by the resulting friction. Moreover, there are several obstructions in the pipe which are above the hydraulic mean gradient line,

and these summits are between Irving Street and Fresh Pond, and as is well known, materially reduce the capacity of the pipe. The new pipe line from Irving Street to Fresh Pond eliminates for that distance all these sources of trouble. It is entirely constructed of concrete sixty-three inches in interior diameter, except for a short distance where the grade of the land required a different construction, and where iron pipe was used forty-two inches in diameter, and the grade is such that there is a continuous fall from Irving Street to Fresh Pond. Unless obstructed, the pipe can never be filled, and there being therefore no strain upon it, it was not necessary to fortify it with steel rods, except for a short distance where it runs under the Fitchburg Railroad track. The concrete is in the judgment of the engineers not only cheaper than iron, but much better. It cannot rust or become tuberculated, is free from electrolytic action and, may last for centuries. This use of concrete was adopted upon the unanimous recommendation of the consulting engineers employed by the Board. The work was done under the direction of Mr. Freeman C. Coffin, as Engineer-in-Chief, and Mr. Charles G. Craib as Superintendent of Construction, and the result was in every way satisfactory.

The work was begun about May 8th last and the section was finished and water was turned on, at the connection with the old main pipe at Irving Street, October 30, 1905. About six hundred laborers were employed upon the work, almost all citizens of Cambridge, the few exceptions being men required for special work and of special qualifications, such as could not be obtained in Cambridge.

The cost of the conduit to December 1, 1905, was \$226,337.47. From a point opposite Irving Street on Arsenal Street, the conduit was constructed in Arsenal Street to a point about opposite the Arsenal gates, and from thence across private land, following in the main, the general direction of the Fitchburg Railroad, and in many places very near it, to Fresh Pond. Under an authority of an act of the Legislature, the Board took by eminent domain for the purpose of the construction of the pipe, a strip of land twenty feet wide extending from Arsenal Street nearly to Fresh Pond. This taking resulted in causing damage to many different owners of the land, of whose claims some have been adjusted, but there are others remaining unsettled and the sum above named will be increased to some extent by the awards of damages that may be made by a jury or

by the same agreed upon between the City and the owners. The Board, with the aid of the City Solicitor, are now endeavoring to make reasonable and proper settlements with the different owners, and it is believed that little or no actual litigation will result from the various takings.

The length of the new section is a little over two miles. Shortly after the water was let on, readings were taken from a Venturi meter placed above the point of junction of the new and the old pipe, which showed that the new pipe was delivering over nine million gallons per day, as compared with a delivery of about six millions through the old pipe. Consequently the conduit has proved an entire success, and with the aid of the yield of the Pond itself will give a supply of at least ten million gallons per day, and probably more, which will suffice to meet the daily average consumption, now about nine million gallons, for some time, possibly for several years. It may be the part of wisdom, however, in view of the yearly increase in consumption of water, which is shown in the tables to be found in the Superintendent's report, hereto annexed, to proceed this year to construct another section of the pipe, so that adequate provision may be made for the future. The next section to be built would be either a pipe line extending from Hobbs Brook Reservoir to Newton Street in Waltham, and there connecting with the original thirty-inch pipe line, or a line extending from Irving Street, Watertown to Newton Street, Waltham, and there connecting with the thirty-inch pipe. There are several arguments in favor of the first alternative. In the first place, this line would add an additional head of 100 feet, the difference in height between the surface of Stony Brook Reservoir and that of Hobbs Brook Reservoir, and therefore yield a large quantity of water. In the second place the water of Hobbs Brook Reservoir is much purer and softer than that of Stony Brook Reservoir, and is nearly as delicious as spring water, and by supplying Fresh Pond with this water alone, the quality of the water in Fresh Pond would be greatly improved, although, as Hobbs Brook Reservoir unfortunately only holds about six months supply, it would be necessary to use Stony Brook water for a part of the year in any event. In the third place, if for any reason the water of Stony Brook should become contaminated by typhoid germs or otherwise, which is not, it is true, very probable, in view of the precautions constantly being taken by the Board, the water takers could for several months be

supplied with pure water from Hobbs Brook alone. For these reasons it might be wise for the City Council to authorize the building of this section next.

Much, however, (and perhaps more) is to be said in favor of extending the present concrete conduit of the same diameter, sixty-three inches, from Irving Street in Watertown to Newton Street in Waltham. This extension would much more largely increase the supply of water at less expense, although it would give no opportunity to separate the waters of the two reservoirs. It would be of cheaper construction than the section from Hobbs Brook, being entirely of concrete, it would be laid wholly or almost wholly in public streets, and hence there would be little or no damages; and there would be little or no rock excavation; whereas the line from Hobbs Brook must be made principally of cast-iron, there will be a large amount of rock to excavate and blast, and the line must go for the most part of its course across private land, involving large damages. Whichever of these two sections may be constructed first, the Board are of opinion that one of them should be built during the ensuing year. While, as above stated, it is *possible* that the section already built may supply the City for several years, it must be borne in mind that possibilities are not what the City needs, but certainties. Considering the rapid increase in consumption of water, and the constant growth in population, the Board are satisfied that the present margin of safety is altogether too small and that it would be dangerous to depend upon the supply furnished by the section of the pipe already built without further extensions.

CLEANING THE OLD PIPE LINE.

The Board are advised by the expert engineers, that it is probable that the tubercles, on the inside of the old pipe line can be removed at moderate cost, probably not exceeding \$10,000 by cutting into the pipe at different points and introducing a mechanical device heretofore successfully used in the cleaning of smaller pipes, which device is forced through the pipe by the pressure of the water, scraping off the tubercles as it passes. The Board have not been able to attempt this work heretofore, for the reason that they have not had enough water in Fresh Pond to make it safe to dispense with the use of the pipe for a sufficient length of time. Now, however, that it is anticipated that Fresh

Pond will be entirely full on or before May 1st, next, the Board advise that an attempt to clean the pipe be made as soon as the Pond shall be full, as the storage in the Pond will then be sufficient to supply the City during the cleansing of the pipe, which it is estimated will take about a month, possibly a little longer. There would be less than six miles of pipe to clean, as it would not be expedient to clean that portion of the pipe between Irving Street and Fresh Pond which is at present disused. In making up the appropriations for the year, the Board will ask for a sum to be appropriated for this purpose. If the operation shall prove a success the flow of water will be largely increased, but the amount of the increase cannot easily be predicted. The result of the cleansing process may be known, however, before it is necessary to begin upon the actual construction of another section, provided there is water enough in Fresh Pond to begin the cleansing process sufficiently early in the Spring, and the result will have an important bearing upon the question of the immediate construction of another section of the new conduit. All necessary surveys and other preparations should be made, however, so that the work of construction of the new section could be begun in May, if then deemed necessary, or proper, as it probably will be.

FRONT POND PARK

The Board have continued the improvement of Kingsley Park, grading new surfaces and preparing them for planting in the Spring. They have expended on the work the sum of \$4,245.20 and will request an appropriation for the completion of the work. The Park and driveways around the Pond are the constant resort of citizens and visitors in need of fresh air and recreation, and it seems to the Board that a reasonable amount of money expended in making the borders of the Pond more beautiful and attractive is well spent, especially, if as usual, it can be charged to maintenance account and paid out of surplus receipts.

STONY BROOK OVERFLOW

The overflow of Stony Brook for the year ending

| | |
|---|-----------------------|
| November 30, 1905, was | 3,168,901,000 gallons |
| For the year ending November 30, 1906, it was | 3,726,899,000 " |
| Increase | 557,998,000 gallons |

This decrease is readily accounted for by the unusual dryness of the season, the year 1905 being the dryest for over ten years. Unfortunately it is impossible to save any of this overflow, except so far as can be done by filling Fresh Pond to the brim when the water is overflowing the dam, and that can be done only by increasing the size of the pipe which leads to Stony Brook Dam. Some of it could be saved by constructing a new reservoir near the sources of the Brook, but it is believed that no new reservoir will be required for many years to come.

The annual rain-fall for the past ten years at Fresh Pond is as follows : —

| Year. | Inches. |
|-------------------|---------|
| 1896 | 38.82 |
| 1897 | 42.53 |
| 1898 | 52.42 |
| 1899 | 37.28 |
| 1900 | 46.89 |
| 1901 | 46.20 |
| 1902 | 43.31 |
| 1903 | 44 23 |
| 1904 | 42.89 |
| 1905 | 32.68 |
| Average | 42.72 |

The rain-fall for the year at Hobbs Brook Reservoir was 37.96 inches ; at Stony Brook, 38.40 inches.

The rainfall at Hobbs Brook in 1904 was 39.95 inches, showing a loss this year of 1.99 inches. The rain-fall at Stony Brook in 1904 was 41.18 inches, showing a loss of 2.78 inches.

CONSUMPTION OF WATER.

| | |
|--|-----------------------|
| The total consumption of water for the year ending December 1, 1905, was | 3,294,159,640 gallons |
| For the year ending December 1, 1904 | 3,210,982,145 " |
| Excess of consumption this year | 83,177,495 gallons |
| The excess of consumption for the year ending December 1, 1904, over the year ending December 1, 1903, was | 50,277,600 gallons |
| In 1895 the total consumption was | 2,190,781,892 " |
| The consumption of the year 1905 being | 3,294,159,640 " |
| and that of 1895 | 2,190,781,892 " |
| In ten years the consumption has increased | 1,103,377,748 gallons |
| or about one-half. | |

The excess of consumption this year is undoubtedly due in great part to the unusual amount of water used for manufacturing purposes, watering lawns, and for street watering, the last two causes due to the unusual dryness of the year.

METERS

The Board have caused to be set this year 346 meters, all upon application of water takers who prefer to pay for their water by meter, rather than to pay schedule rates. There are now in use 2,446 meters. The number of water supplies is 14,927, so that the proportion of metered supplies is only a little over one-fifth.

There is no doubt that a complete meter system would result in a great saving of water, and in the prolongation of the life of the water supply. The Board have frequently advocated the general use of meters, as may be seen by reference to their previous annual reports, but hitherto the City Council has not seen fit to make the necessary appropriations.

Mr Coffin in his report, annexed to the report of the Water Board for 1923, page 78, estimated the total saving which would be effected by the general use of meters from the year 1905 to 1924, at the sum of \$431,822.

Whatever may be the individual views of the members of the City Council, it would seem that all might concur in this, that the subject is at least worthy of thorough investigation and careful consideration.

The Board desire, in conclusion, to express their appreciation of the thorough and efficient manner in which the work of the construction of the new pipe line has been performed by the Chief Engineer, Mr Freeman Coffin, and his efficient Superintendent, Mr Crath. The work has not been delayed, but promptly finished in ample season and it has been done well. They also wish to acknowledge the valuable services of the City Engineer, Mr Hastings, who, with his assistants, had charge of the field work.

Attention is especially directed to the report of Mr Coffin, annexed to this report, where many details will be found which cannot be included in this report. Mr Coffin has been employed by the Board for two years.

and has made careful investigation and study of the Cambridge Water Works, and of the proper methods to develop their resources economically and to the best advantage.

Respectfully submitted,

WILLIAM B. DURANT,
GEORGE H. HOWARD,
JOHN F. O'BRIEN,
ANDREW J. RADY,
EDMUND H. STEVENS,

· *Cambridge Water Board.* ·

**FINAL REPORT OF FREEMAN C. COFFIN UPON THE CON-
STRUCTION OF THE SIXTY-THREE-INCH CEMENT CON-
DUIT, FROM IRVING STREET, IN WATERTOWN, TO
FRESH POND, IN CAMBRIDGE**

Boston, December 19, 1905

To the Water Board of the City of Cambridge. -

SIR: I submit the following final report upon the construction of the conduit from Irving Street, in Watertown, to Fresh Pond, in Cambridge.

The total length of this conduit from the point where it begins in Arsenal Street near Irving Street, in Watertown to the inlet to Fresh Pond is about 12,125 feet. About 11,500 feet are of concrete, five feet three inches in diameter inside. 475 feet are of forty-two-inch cast-iron pipe thirty-four feet are taken up by the inlet chamber and well, and there are 117 feet of thirty-inch cast-iron pipe making the inlet to Fresh Pond.

The concrete section has a fall of three inches in 1,000 feet, except at one point, where there is a fall of two feet in ninety feet. The capacity of the concrete section was estimated at thirty million gallons in twenty-four hours. Actual measurements taken of the velocity of the water after completion indicate that its actual capacity, when running full, will be thirty five millions or more.

The thirty and forty-two-inch cast iron pipe sections have been given such a fall that their respective capacities are greater than that of the concrete section. The forty-two-inch pipe has a fall of two feet in its length of 475 feet. The thirty-inch pipe is so arranged that the water will rise in the well until there is a sufficient head over the surface of the water in Fresh Pond to discharge all of the water that comes to it. Thirty five millions will require about three feet head, or the raising of the water in the well about three feet above the surface of the water in the Pond.

The conduit will no doubt become somewhat coated with vegetable matter from the water, which will reduce its carrying capacity somewhat.

It can, however, be easily cleaned and its original capacity restored. Drawings showing the plan and profile of the conduit and the details of its construction accompany this report.

Work was begun on the excavation of this conduit May 8, 1905, on Section No. 3 in private land belonging to the estate of Tyler Bigelow near Arsenal Street. The first concrete was laid in the conduit near the brook in the aforesaid land on May 16, 1905. The first piece of the conduit laid, twenty feet in length, was of the following dimensions: five feet and three inches inside diameter, six inches in thickness on the bottom, fifteen inches on the sides at the springing line of the arch and seven inches on top.

After this piece was laid, the forms were changed to make the sides thirteen inches thick instead of fifteen inches cross section. Since then no change has been made in the dimensions of the conduit and, with the exception of the first twenty feet, and a few places where there are special sections, it is as shown on the accompanying drawings throughout its length. The special sections are also shown on the drawings.

Owing to a mistake in setting grades, the conduit near the "Creamery" on Wheeler Court for about ninety feet in length was not laid to the true grade, being about four inches too high at the highest point. The bottom was cut out and repaved at the correct grade. The entire bottom of the conduit now corresponds with the true grade as shown upon the accompanying profile.

These, I believe, were the only changes in design or mistakes in construction made throughout the entire work.

The work was divided into six sections, upon which work was commenced in the following order: Section No. 3, Section No. 2, Section No. 4, Section No. 1, Section No. 5 and Section No. 6. This division is shown on the drawings.

There were four points on the line at which it seemed that the work could be done more economically in tunnel than in an open cut, one in Section No. 3, one in Section No. 4, one in Section No. 5 and one in Section No. 6. The total length of the work in tunnels was about 1,400 feet. Rock excavation was met with in a part of the tunnel in Section No. 5 under Mount Auburn Street. This was the only rock work encountered in the entire excavation.

In the tunnel in Section No. 3, about opposite the Head Rubber Works, the upper half of the conduit was constructed of brick masonry. All of the remainder of the conduit was entirely of concrete.

The concrete was formed by means of steel forms or centers. It was composed of one part Portland cement, two and one-half parts of sand and five parts of screened gravel. The brand of cement used was the Heisterberg, which proved very satisfactory. Tensile tests were made of same; as from each carried with the following result:

| | | | | | | | |
|-----------|---------|----|----------------------|---------|------------------|-----|-------|
| Test test | 24 hrs. | at | of 410 lb. pressure, | 272 lbs | tensile strength | | |
| | 7 days | " | " | 630 | " | 607 | " " " |
| " | 28 | " | " | 630 | " | 807 | " " " |
| 1 to 3 | 7 | " | " | 630 | " | 770 | " " " |
| " | 28 | " | " | 630 | " | 878 | " " " |
| | 3 mos. | " | " | 10 | " | 466 | " " " |
| | 6 | " | " | 3 | " | 336 | " " " |

These tests were made by Mr. Nelson A. Hallett of No. 1 Ashburton Place, Boston.

The following are the quantities in this work:

| | |
|--------|---|
| 67,916 | cubic yards excavation, average depth 14 25 feet. |
| 3,330 | " " tunnels |
| 200 | " " at inlet chamber |
| 1,300 | " " embankment. |
| 0.620 | " " concrete |
| 47 | " " brick work in tunnels |
| 21 | " " in house over inlet chamber |
| 490 | feet 48 inch cast iron pipe |
| 117 | " 30-inch " " |
| 6 | " 63 inch steel pipe at culvert |
| 17 | manholes and covers |

The total amount of cement used on the work was 11,613 barrels. If a cement came in bags which were charged at the rate of 40 cents per barrel, or ten cents each, amounting in all to \$4,645.20. Credit was received for bags returned to the amount of \$4,200.00, or a loss on bags of \$445.20 due to lost and damaged bags. This amounts to practically one cent per barrel for the use of the bags. If wooden barrels had been used, the net cost would have been thirty cents per barrel. Very little cement was lost, certainly not equal to ten barrels perhaps no more than would have been lost in barrels. From \$3,000 to \$3,500 was saved by buying the cement in cotton rather than in wood. Out of the total

cement used it is estimated that from 75 to 100 barrels were used for laying brick, brushing and finishing surfaces, which leaves about 1.3 barrels per cubic yard as the average amount of cement used in the concrete, which, as before stated, was mixed in the proportion of one, two and one-half, and five.

The cost of the concrete in place as nearly as it can be estimated was as follows:—

| | | | | | | |
|-----|---|---|---|---|---|---------------|
| .90 | cubic yards gravel, at \$1 42 | . | . | . | . | \$1 28 |
| .45 | " " sand, " 1 00 | . | . | . | . | 45 |
| 1.3 | barrel cement, " 1 35 | . | . | . | . | 1 76 |
| | Cost of forms, \$4,233÷8,650 yards | . | . | . | . | 49 |
| | Labor, including setting and cleaning forms | . | . | . | . | 3 25 |
| | Cost per yard of concrete in place | . | . | . | . | <u>\$7 23</u> |

The above cost does not include the cost of lumber, which was very small, the use of tools, general superintendence, inspection or engineering. On the other hand, it was based upon the cost of sand and gravel when bought from outside parties. Some of the sand and gravel used was taken from the trench and cost less than the above figure per yard for labor in screening and hauling.

The total amount paid out for sand and gravel was \$11,730, or about \$1.35 per yard, for all of the concrete laid instead of \$1.73, as given in the above estimate, which would indicate that, at the prices paid, the sand and gravel for 1,865 yards of concrete was found on the ground, or an amount which would have cost \$3,234 if bought from outside. How much it actually cost we do not know, except that it did not cost as much in any case as it would to buy it.

It should also be stated that the forms, which are of steel, are still on hand and available for further use, and will no doubt be capable of doing as much more work as they have already done, so that in case the conduit is extended the further use of the forms would materially decrease the cost of this item in the concrete.

COST OF SOME OF THE ITEMS THAT ENTER INTO
THE WORK.

| | |
|---|-------------|
| Lumber | \$10,798 91 |
| Cement | 15,648 74 |
| Sand and gravel delivered on ground | 11,729 58 |

;

;

| | | |
|---|-------------|-------------|
| Steel work, including forms for concrete, bulk plates, chutes etc | | \$4,727 29 |
| Cast iron pipe and special castings | | 3,037 16 |
| Tanks and machinery | | 3,723 93 |
| Rest of machinery | | 4,147 20 |
| Teaming | | 9,000 00 |
| Labour on concrete | \$79,112 00 | |
| Labour on all other work | 64,770 04 | |
| Wreckers | 2,644 00 | |
| Chief timekeepers, messengers, stockroom men, etc | 1,961 25 | |
| Foremen | 9,636 00 | |
| Inspectors not including Watertown Inspector) | 2,620 00 | |
| General superintendence including horse hire | 2,764 00 | |
| <hr/> | | |
| Total labor on pay roll less division engineers | | 130,793 29* |
| Engineering | | 7,120 00 |
| Food & M. & K. K. shillings, expense of crimping, etc. | | 1,318 60 |
| Food Town of Watertown for building works, rolling streets, furnishing water, etc | | 3,770 15 |

* This was up to and including November 20th. A little work on brick house - see last chapter has been done since then.

TABLE GIVING COST OF DIFFERENT ITEMS PER CUBIC YARD, PER LINEAL FOOT, AND AS AN APPROXIMATE PERCENTAGE OF THE TOTAL COST OF THE WORK

| Item | Cost of Item | Cost per Cubic Yard | | Cost per Lineal Foot | Approximate Percentage of Total Cost |
|---------------------------|--------------|---------------------|----------------------|----------------------|--------------------------------------|
| | | Concrete
\$1.00 | Excavation
\$1.00 | | |
| Excavation to open trench | \$4.00 | | \$0.12 | \$0.27 | |
| Excavation to bottom | 4.00 | | 1.24 | 2.16 | |
| Excavation for concrete | 300 | 1.25 | | 4.00 | |
| Total concrete | 12,400 | | | 1.20 | 1.1 |
| Cost for engines | 250 | | 0.125 | 0.64 | .06 |
| Tanks and machinery | 3,723 | | 1.000 | 0.9 | .34 |
| Rest of machinery | 4,147 | | 1.00 | 2.4 | .19 |
| Steel work and forms | 4,727 | .00 | | 2.5 | .19 |
| Teaming | 9,000 | | 1.00 | 0.1 | .03 |
| Labour on concrete | 79,112 | 1.25 | | 2.20 | 12.0 |
| Labour on other work | 64,770 | | 1.00 | 0.7 | 2.7 |
| Wreckers | 2,644 | 1.00 | 0.00 | 2.00 | 1.1 |
| Chief and timekeepers | 1,961 | 0.10 | 0.00 | 1.4 | 0.9 |
| Foremen | 9,636 | | .70 | 0.0 | 6.6 |
| Inspectors | 2,620 | .20 | | 2.1 | 1.3 |
| General superintendence | 2,764 | 1.00 | 0.00 | 2.3 | 1.9 |
| Engineering | 7,120 | 1.10 | 0.00 | 2.0 | 3.75 |

Note: The foregoing table does not cover all of the expenses incurred on the work, but only those as were readily capable of separation and analysis. The unit costs and percentages are not exact, but close approximations to the exact figures. The division of labour cost is an approximate estimate, but the total labour cost is correct.

The work was completed ready for the water October 13, 1905, and the water was turned on for a test on that day. It was allowed to run

about sixty hours, when it was shut off and a careful inspection made of the inside of the conduit. It was found to be in perfect condition throughout its length. Water was finally and officially turned on at 2.15 P.M., November 2, 1905.

The following are the names of those comprising the organization of this work and who are responsible for its execution and success.

All of the field work of laying out the line and giving grades for the conduit was done under the direction of Mr. L. M. Hastings, the City Engineer, and by engineers from his office; Mr. Charles G. Craib, General Superintendent; Mr. A. E. Lyford and Mr. Seth Peterson, Division Engineers; Mr. James Grant, Mr. William Lindsay, Mr. William J. O. Brien, Mr. Charles Parker, Mr. Michael Rady, Mr. Henry A. Simonds and Mr. Joseph A. Wood, Foremen of Sections; Mr. John Craib, Foreman of Tunnel Work; Mr. E. W. Ellis, Mr. W. S. French, Mr. E. Grenier, Mr. Harry Joel, Mr. L. E. Kollock and Mr. F. Neddell, Inspectors; Mr. E. J. Carroll, Inspector of Stock; Mr. J. O. Connell, Clerk and Inspector of Stock; Mr. Walter S. Hall, Timekeeper; Mr. Joseph A. Genest, Assistant Timekeeper.

PRESENT CAPACITY OF THE LINE FROM STONY BROOK DAM.

This section of the conduit was built (as part of a plan adopted by the Water Board for a line that would have a capacity to carry thirty million gallons per day from Stony Brook and Hobbs Brook Basin to Fresh Pond) to increase the flow through the present line from Stony Brook Dam by avoiding the summits on the lower end of that line and thus make available a greater head on a shorter line. The effective head on the old line was about thirty-four feet in 5,100 feet of thirty-six-inch pipe and 34,340 feet of thirty-inch pipe.

This was found by measurement to give a discharge of 5,750,000 gallons per day into Fresh Pond. By shutting gates and expelling the air from the summits this could be increased to over 6,000,000 gallons per day. This was explained in my report of December 1st, 1903. Since then the gate has been shut twice each day instead of once a day before. Either this or some other cause has increased the flow slightly, and it has averaged for the past year about six and one-half million gallons.

The following table shows the flow as measured by the Venturi meter, and read about once a month for the past two years.

FLOW OF WATER THROUGH 30 INCH PIPE FROM STONY BROOK TO FRESH POND

| Date | Flow Through Cast Iron Pipe | Date | Flow Through Cast Iron Pipe |
|--------------------|-----------------------------|-------------------|-----------------------------|
| September 2, 1925 | 6,325,000 | January 19, 1926 | 6,105,000 |
| September 11, 1925 | 6,400,000 | February 12, 1926 | 6,400,000 |
| November 9, 1925 | 6,361,000 | March 11, 1926 | 6,404,000 |
| November 22, 1925 | 6,371,000 | March 17, 1926 | 6,370,000 |
| May 11, 1926 | 6,419,000 | March 21, 1926 | 6,411,000 |
| June 26, 1926 | 6,600,000 | April 7, 1926 | 6,600,000 |
| July 16, 1926 | 6,670,000 | May 19, 1926 | 6,670,000 |
| August 12, 1926 | 6,652,000 | June 20, 1926 | 6,570,000 |
| September 22, 1926 | 6,610,000 | July 29, 1926 | 6,604,000 |
| October 11, 1926 | 6,670,000 | August 22, 1926 | 6,610,000 |
| November 26, 1926 | 6,620,000 | October 11, 1926 | 6,100,000 |
| December 6, 1926 | 6,604,000 | October 20, 1926 | 6,500,000 |
| December 16, 1926 | 6,570,000 | | |

The building of the new conduit from Fresh Pond to Irving Street, a distance of 12,125 feet, results in securing an effective head of 46 feet in 3,100 feet of thirty six inch and 22,740 feet of thirty inch pipe. It was estimated in advance of the building of this conduit that it would increase the flow to 9,000,000 gallons per day. When the water was turned on November 2nd, the flow was 9,000,000 gallons. On December 5th it was 9,100,000 gallons. It may be that the increased velocity has secured the pipes somewhat and has slightly increased the flow.

To this flow of water through the pipe line should be added the yield of Fresh Pond and its watershed to find the total available supply. The natural yield of this Pond in a year of average rainfall is about 2,000,000 gallons per day. In the driest period, of which we have the record of yield, about 1,630,000 gallons per day would have been furnished by drawing the Pond as low as it was drawn last year. If the surface flow on this watershed is taken off by sewers to a certain extent, the yield would be diminished by this amount. It is probable that there is now available from 10,000,000 to 11,000,000 gallons per day. The average consumption of 1925 was 9,000,000 gallons per day.

For 23 days after the water was let into the new conduit the consumption was 8,114,442 gallons per day, or a total of 267,923,106 gallons. During the same time the water in the Pond rose 11 1/8 inches, a gain of about 44.5 millions, or a total yield of 316 1/2 million gallons. The pipe line was delivering about 205 millions per day on the average, or a total

in the 33 days of 298.6 millions, leaving 17.8 millions or about 540,000 gallons per day as the yield of the watershed. This was during a very dry time. It is evident that with a rise in the Pond of 10 inches in a month like November of this year it is sure to be filled (about 4 feet more) on or before May 1, 1906, even with the probable increased consumption of the colder months.

As the new conduit has a carrying capacity of from 30 to 35 million gallons per day when running full, it is evident that the available capacity of the line is controlled by the capacity of the iron pipe line from the end of the conduit to Stony Brook Dam. This capacity is now, as already stated and as measured by the meter, 9 or 9.1 million gallons per day. With this amount of water the flow in the new conduit is 1.75 feet in depth above the invert, that is, the channel is filled to about 29 per cent. of its area.

I believe that the capacity of the cast-iron pipe line can be increased by cleaning it or scraping the tubercles from its inner surface. There is no doubt that the flow will be increased by such cleaning. There is little or no data upon which to make an estimate of the probable increase. The present flow is 9.1 million gallons. The flow after cleaning can hardly exceed 12 million gallons, and may, of course, be much less. I believe it to be very desirable to clean the pipe and secure all of the increase possible unless a further section of the proposed conduit is to be laid within a year or two. It would then be unnecessary to clean the present pipe.

The plan adopted by the Water Board included the building of four sections as required, and in the following order:—

SECTION No. 1. From Hobbs Brook Dam to connect with the present cast-iron pipe at Newton Street, in Waltham. This section, it was estimated, would increase the flow to 9,750,000 gallons daily.

SECTION No. 2. From Irving Street to Fresh Pond. This section, if built in this order, would increase the flow to 11,750,000 gallons per day.

SECTION No. 3. From Newton Street to Irving Street. This section, if built in this order, would increase the available capacity to 17,000,000 gallons daily.

SECTION No. 4. From Newton Street parallel with present pipe to

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•

the junction of the thirty-inch and thirty-six inch pipes. This section would increase the capacity to 30,000,000 gallons per day.

It was finally decided (wisely, as I believe) to construct Section No. 2 first. This has been done with the result given above. When the time shall arrive for continuing this work, it will be necessary to determine which section shall be built next, whether No. 1 or No. 3 of the plan adopted. It seems proper at this time to make a statement of the results to be expected from either course.

If Section No. 1 is built next, the capacity will be increased from 9,000,000 to 11,750,000. This section will provide for taking a part of the water from Hobbs Brook Basin directly, or without passing through Stony Brook Basin. The disadvantage of this arrangement, if it is a disadvantage, is that it requires careful observation of the water in the two basins, and a change of use from one to the other at proper times in order to secure the maximum capacity of the line. The advantage of the plan is that, if for any reason it should be desirable to discontinue the use of water from either Hobbs Brook or Stony Brook Basin for a time, it could be done for as long as there was water in the other.

This would be desirable in the case of an epidemic of water borne disease upon one of the watersheds which did not occur at the same time upon the other. This may, of course, be a state of things that will never occur.

If Section No. 3 is built next, it will increase the capacity of the line to 16 million gallons. The advantage of this plan is in its greater capacity, giving a flow of 16 million gallons instead of 11.75 millions, and the simplicity of operation. With the yield of Fresh Pond, the total available supply will be over 18 million gallons per day, or nearly, if not quite, as much as the watersheds can be developed to supply.

In none of the foregoing figures has the effect of cleaning the present pipe been included. This, if done, would increase each one over the figure given about two million gallons per day.

Careful surveys and borings have not been made of the line of Section No. 3, and, therefore, no reliable estimates of cost. It is probably safe to say that its cost will be rather less than that of Section No. 1.

Respectfully submitted,

FREEMAN C. COFFIN

REPORT OF THE WATER REGISTRAR

WATER REGISTRAR'S OFFICE,

CAMBRIDGE, December 1, 1905.

To the Cambridge Water Board : —

GENTLEMEN : — In compliance with the requirements of the City Ordinance I present the forty-first annual report of the operations of this Department showing the receipts, expenditures and abatements, together with a statement of the number of water takers, etc., for the year ending November 30, 1905.

Amount of bills remaining unpaid November 30, 1904 : —

| | |
|--------------------------------|------------|
| Water rates | \$5,410 37 |
| Supplies and repairs | 778 18 |
| Off and on | 150 00 |
| Seals | 8 50 |
| Maintenance account | 602 62 |
| Construction account | 156 26 |

Amount of bills placed in hands of City Treasurer for collection from November 30, 1904, to November 30, 1905 : —

| | |
|--------------------------------|---------------------|
| Water rates | \$351,399 53 |
| Supplies and repairs | 4,024 61 |
| Off and on | 529 00 |
| Rents | 168 00 |
| Seals | 88 75 |
| Maintenance account | 2,916 16 |
| Construction account | 1,271 99 |
| Total bills | <u>\$367,503 97</u> |

There has been collected : —

| | |
|--------------------------------|--------------|
| Water rates | \$345,795 07 |
| Supplies and repairs | 3,585 81 |
| Off and on | 499 00 |
| Rents | 160 00 |
| Seals | 91 25 |
| Maintenance account | 1,081 44 |
| Construction account | 800 29 |

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There has been abated

| | |
|---|------------|
| Water rates, off and on, and seals, supplies and repairs,
and Construction account | \$3,003 33 |
|---|------------|

There remains uncollected

| | |
|----------------------|--------------------------------|
| Water rates | 8,160 30 |
| Supplies and repairs | 1,910 34 |
| Off and on | 160 00 |
| Seals | 1 75 |
| Maintenance account | 2,437 34 |
| Construction account | 637 96 |
| Total | 13 00 |
| | <u> </u> \$347,100 97 |

EXPENDITURES

| | |
|----------------------|--------------------------------|
| Construction account | \$231,232 37 |
| Maintenance account | 103,043 00 |
| | <u> </u> \$334,275 37 |

ABATEMENTS

| | |
|---|------------|
| Water rates, and supply and repair bills to the amount of | \$7,003 33 |
|---|------------|

RECEIPTS

| | |
|---|-------------------|
| Water rates to the amount of | \$1,479 07 |
| Which amount deducted from receipts | 343,796 07 |
| | <u> </u> |
| Leaves net receipts for water | \$343,916 00 |
| Add off and on, seals, rates, seals and Maintenance account | 1,231 00 |
| | <u> </u> |
| Makes net receipts of rates, seals, etc. | \$345,147 00 |

OFF AND ON

Water has been shut off for nonpayment of rates, or per order on account of vacancy, and seals have been applied to fixtures by request of owners, as follows

| | |
|--|-----|
| Water shut off in 1903 | 301 |
| Supplies let on, shut off in 1904 | 600 |
| Supplies let on, shut off in previous years | 110 |
| New supplies let on | 111 |
| Seal locks applied to fixtures in 1903 | 201 |
| Seal locks removed put on in 1903 | 247 |
| Seal locks removed, put on in previous years | 264 |

Statement of yearly revenue received from water rates since the purchase of the works by the City —

| | |
|--|-------------|
| From April 20, 1863, to December 1, 1863 | \$22 267 19 |
| From December 1, 1863, to December 1, 1864 | 60,073 27 |
| From December 1, 1864, to December 1, 1865 | 13,713 03 |

| | | | | | | |
|--|---|---|---|---|---|-------------|
| From December 1, 1867, to December 1, 1868 | . | . | . | . | . | \$63,747 42 |
| From December 1, 1868, to December 1, 1869 | . | . | . | . | . | 76,149 30 |
| From December 1, 1869, to December 1, 1870 | . | . | . | . | . | 92,605 95 |
| From December 1, 1870, to December 1, 1871 | . | . | . | . | . | 111,782 65 |
| From December 1, 1871, to December 1, 1872 | . | . | . | . | . | 127,201 30 |
| From December 1, 1872, to December 1, 1873 | . | . | . | . | . | 146,117 32 |
| From December 1, 1873, to December 1, 1874 | . | . | . | . | . | 153,634 27 |
| From December 1, 1874, to December 1, 1875 | . | . | . | . | . | 138,880 37 |
| From December 1, 1875, to December 1, 1876 | . | . | . | . | . | 179,166 76 |
| From December 1, 1876, to December 1, 1877 | . | . | . | . | . | 154,843 59 |
| From December 1, 1877, to December 1, 1878 | . | . | . | . | . | 157,443 91 |
| From December 1, 1878, to December 1, 1879 | . | . | . | . | . | 164,681 90 |
| From December 1, 1879, to December 1, 1880 | . | . | . | . | . | 173,325 49 |
| From December 1, 1880, to December 1, 1881 | . | . | . | . | . | 170,062 73 |
| From December 1, 1881, to December 1, 1882 | . | . | . | . | . | 177,430 80 |
| From December 1, 1882, to December 1, 1883 | . | . | . | . | . | 179,361 89 |
| From December 1, 1883, to December 1, 1884 | . | . | . | . | . | 161,526 27 |
| From December 1, 1884, to December 1, 1885 | . | . | . | . | . | 185,544 36 |
| From December 1, 1885, to December 1, 1886 | . | . | . | . | . | 199,404 43 |
| From December 1, 1886, to December 1, 1887 | . | . | . | . | . | 204,748 64 |
| From December 1, 1887, to December 1, 1888 | . | . | . | . | . | 211,156 27 |
| From December 1, 1888, to December 1, 1889 | . | . | . | . | . | 221,124 70 |
| From December 1, 1889, to December 1, 1890 | . | . | . | . | . | 231,116 32 |
| From December 1, 1890, to December 1, 1891 | . | . | . | . | . | 227,054 58 |
| From December 1, 1891, to December 1, 1892 | . | . | . | . | . | 237,527 08 |
| From December 1, 1892, to December 1, 1893 | . | . | . | . | . | 242,219 78 |
| From December 1, 1893, to December 1, 1894 | . | . | . | . | . | 250,032 71 |
| From December 1, 1894, to December 1, 1895 | . | . | . | . | . | 268,813 62 |
| From December 1, 1895, to December 1, 1896 | . | . | . | . | . | 281,030 00 |
| From December 1, 1896, to December 1, 1897 | . | . | . | . | . | 291,457 62 |
| From December 1, 1897, to December 1, 1898 | . | . | . | . | . | 297,129 78 |
| From December 1, 1898, to December 1, 1899 | . | . | . | . | . | 302,569 00 |
| From December 1, 1899, to December 1, 1900 | . | . | . | . | . | 319,479 37 |
| From December 1, 1900, to December 1, 1901 | . | . | . | . | . | 320,468 01 |
| From December 1, 1901, to December 1, 1902 | . | . | . | . | . | 323,500 53 |
| From December 1, 1902, to December 1, 1903 | . | . | . | . | . | 333,777 34 |
| From December 1, 1903, to December 1, 1904 | . | . | . | . | . | 339,109 27 |
| From December 1, 1904, to December 1, 1905 | . | . | . | . | . | 343,916 00 |

本公司地址 龍運山(中)街九號

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COMPARATIVE STATEMENT.

[illegible]

In addition to the customary expenditures, there has been paid this year from the receipts for water the following amounts, viz. : —

| | |
|---|-------------|
| Metropolitan water | \$28,458 50 |
| Grading at Fresh Pond Reservoir | 4,285 50 |
| | <hr/> |
| | \$32,744 00 |

If the above unusual expenditures had not occurred, there would have been excess receipts of \$23,000.00.

In addition to the manufactories, business blocks, houses, etc., supplied through meters, water is supplied to 16,270 families, 489 stables, 1,442 horses, 64 cows, 150 shops, 352 offices and stores, by the following fixtures : —

| | |
|-----------------------|---------------------|
| 18,728 faucets. | 3 hopper closets. |
| 6,865 wash basins. | 30 urinals. |
| 9,603 wash tubs. | 7 yard hydrants. |
| 6,330 bath tubs. | 14 tumbler washers. |
| 123 slop closets. | 1,451 hand hose. |
| 16,621 water closets. | 5 motors. |

Also,

| |
|---|
| 1,031 fire hydrants (besides 19 on private premises). |
| 8 fire reservoirs. |
| 65 street watering standpipes. |
| 28 drinking fountains in public squares. |
| 4 public sanitariums. |

The above schedule of fixtures does not include those in school-houses, engine houses, police stations, and other City buildings, or where the use of water is covered by meter.

The usual house-to-house inspection has been made.

Respectfully submitted,

WALTER H. HARDING,

Registrar.

ANNUAL STATEMENT OF THE WATER REGISTRAR TO THE COMMITTEE ON ACCOUNTS, DECEMBER 1, 1905

Collected November 30, 1904

| | | |
|----------------------|------------|------------|
| Water rates | \$5,470 37 | |
| Supplies and repairs | 778 16 | |
| Off and on | 140 00 | |
| Seals | 8 40 | |
| Maintenance account | 412 62 | |
| Construction account | 146 26 | |
| | <hr/> | \$7,105 81 |

Bills placed in the hands of the City
Treasurer for collection from Decem-
ber 1, 1904, to December 1, 1905 —

| | | |
|----------------------|------------|-------------------|
| Water rates | \$3,139 13 | |
| Supplies and repairs | 4,094 61 | |
| Off and on | 379 00 | |
| Seals | 140 00 | |
| Seals | 88 75 | |
| Maintenance account | 2,914 16 | |
| Construction account | 1,271 79 | |
| | <hr/> | \$36,038 04 |
| Total bills | | <hr/> \$36,343 97 |

There has been collected

| | | |
|----------------------|--------------|--------------|
| Water rates | \$343,795 07 | |
| Supplies and repairs | 1,145 01 | |
| Off and on | 479 00 | |
| Seals | 140 00 | |
| Seals | 91 37 | |
| Maintenance account | 1,001 44 | |
| Construction account | 200 79 | |
| | <hr/> | \$345,852 68 |
| Total collections | | |

There has been stated

| | |
|--|------------|
| Water rates, off and on, and seals, sup-
plies and repairs, and Construction
account | \$2,441 13 |
|--|------------|

STATEMENT OF THE WATER REGISTRAR.

There remains uncollected : —

| | | | |
|--------------------------------------|-------------------|-------------|--------------|
| Water rates | \$8,148 39 | | |
| Supplies and repairs | 1,210 34 | | |
| Off and on | 168 00 | | |
| Seals | 5 75 | | |
| Maintenance account | 2,437 34 | | |
| Construction account | 627 96 | | |
| Rent | 8 00 | | |
| | <u> </u> | \$12,605 78 | |
| Total bills for collection | | | \$367,503 97 |
| Less abated | \$2,885 33 | | |
| Less refunded | 1,879 07 | | |
| Less unpaid | 12,605 78 | | |
| | <u> </u> | \$17,370 18 | \$17,370 18 |
| Net receipts | | | \$350,133 79 |

Attest :

WALTER H. HARDING,
Registrar.

CAMBRIDGE, December , 1905.

We have examined the accounts of the Water Registrar and find that they correspond in the amounts collected, abated, refunded, and uncollected with the statement submitted by the City Treasurer and verified by the City Auditor.

Committee on Accounts.

CAMBRIDGE, Mass.,
OFFICE OF THE CITY TREASURER.

To the Cambridge Water Board

I give you herewith a record of the transactions between the Water Board and the City Treasurer's Office during the year ending November 30, 1905.

| | |
|---|-------------|
| Amounts received for account of Water Works Maintenance. | |
| Water Rates and Supply Accounts | \$334.00 90 |
| Amounts collected for account of Water Works - Construction | |
| Account | 3,431 74 |
| Amounts received and paid on Water Rates | 2,043 20 |
| Refund certificates received and paid on Water Rates | 1,079 07 |
| I transferred into my hands November 30, 1905, for account of | |
| Water Rates Maintenance and Supply Accounts | 11 97 03 |
| I transferred to November 30, 1905, for account of Construction | 677 96 |

Very respectfully,

WM. W. DALLINGER,
City Treasurer

I have examined the above statement and find the same correct

HARRY T. UPHAM,
City Auditor

REPORT OF THE SUPERINTENDENT OF WATER WORKS

CAMBRIDGE, December, 1905.

To the Honorable Water Board of the City of Cambridge:—

GENTLEMEN:—Complying with the City Ordinance, I herewith submit the annual report of the Superintendent, for the year ending November 30, 1905.

| | Gallons. |
|--|---------------|
| Total water pumped | 2,778,089,840 |
| Total water purchased from Metropolitan Water and Sewerage Board | 531,070,000 |
| Total water consumed | 3,294,159,840 |
| Quantity of water sold by meter | 1,240,548,780 |
| Quantity of water used for sprinkling streets | 77,000,000 |
| Quantity of water used for flushing sewers | 1,000,000 |
| Quantity of water used for cleaning sanitaries | 7,500,000 |
| Quantity of water used for public buildings | 33,000,000 |
| Quantity of water used for drinking fountains | 35,000,000 |
| Quantity of water used for testing meters | 58,000 |
| Quantity of water used for fire purposes | 4,000,000 |

Number of gallons daily for each inhabitant on the total amount consumed, 92.63.

COMPARATIVE STATEMENT OF TOTAL CONSUMPTION DURING THE PAST TEN YEARS.

| Date. | Total Yearly Consumption. | Increase or Decrease. | Average Daily Consumption. | Increase or Decrease. | Gallons to each Inhabitant daily. | Estimated Population. |
|-------|---------------------------|-----------------------|----------------------------|-----------------------|-----------------------------------|-----------------------|
| 1896 | 2,418,508,557 | 222,724,665 increase | | increase | 75.90 | 51,468 |
| 1897 | 2,441,340,198 | 27,832,639 " | | " | 76.46 | 77,480 |
| 1898 | 2,792,321,110 | 350,980,914 " | | " | 86.60 | 89,378 |
| 1899 | 2,892,570,430 | 90,249,320 " | | " | 87.16 | 90,997 |
| 1900 | 2,851,277,240 | 231,268,180 decrease | | decrease | 76.69 | 82,308 |
| 1901 | 2,785,158,440 | 133,879,200 increase | | increase | 80.87 | 92,716 |
| 1902 | 2,630,553,545 | 145,397,105 " | | " | 85.27 | 94,182 |
| 1903 | 3,160,704,360 | 230,150,815 " | | " | 89.86 | 95,625 |
| 1904 | 3,210,222,145 | 50,277,785 " | | " | 89.68 | 97,226 |
| 1905 | 3,294,159,840 | 83,177,495 " | | " | 92.63 | 97,428 |

| | |
|--|---------------|
| Total amount of coal consumed | 2,149,000 lbs |
| Amount consumed in 29 days in which Metropolitan Water and Sewerage Board supplied the City | 76 406 " |
| Total amount used for pumping purposes | 2 494,196 " |
| Daily average amount used for pumping purposes (306 days) | 11,619 " |
| Daily average on total amount consumed | 9,834 " |
| Coal consumed per million gallons pumped | 1,260 " |
| Highest water elevation in Fresh Pond was on December 20, 1904 | 14 10 |
| Lowest water elevation in Fresh Pond was on August 4th | 9 00 |
| Average height of water in Fresh Pond | 12 91 |
| Highest water elevation in Stony Brook Reservoir was on March 20 | 42 16 |
| Lowest water elevation in Stony Brook Reservoir was on March 9 | 39 17 |
| Highest water elevation in Hobbs Brook Reservoir No 1, Lincoln Street, was on March 27th | 141 75 |
| Lowest water elevation in Hobbs Brook Reservoir No 1, Lincoln Street, was on September 1st | 130 15 |
| Highest water elevation in Hobbs Brook Reservoir No 2, Winter Street, was on March 24th | 141 73 |
| Lowest water elevation in Hobbs Brook Reservoir No 2, Winter Street was on December 27, 1904 | 124 00 |
| Total rainfall at Fresh Pond Pumping Station | 23 00 |
| Total rainfall at Stony Brook Reservoir | 24 40 |
| Total rainfall at Hobbs Brook Reservoir | 27 96 |

TOTAL RAINFALL FOR THE PAST TEN YEARS

| | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | in | in | in | in | in | in | in | in | in | in |
| January | 1 20 | 1 40 | 4 31 | 2 00 | 1 20 | 1 24 | 2 21 | 4 57 | 2 57 | 1 20 |
| February | 2 00 | 2 22 | 4 23 | 2 00 | 4 00 | 1 25 | 1 57 | 2 20 | 2 00 | 2 47 |
| March | 2 00 | 2 20 | 2 41 | 2 20 | 2 24 | 2 20 | 4 20 | 2 20 | 2 00 | 1 00 |
| April | 4 57 | 2 00 | 2 00 | 2 24 | 2 24 | 0 00 | 4 24 | 4 20 | 2 20 | 2 20 |
| May | 1 20 | 2 00 | 0 20 | 1 22 | 1 20 | 0 00 | 2 20 | 2 20 | 0 27 | 2 07 |
| June | 2 02 | 0 24 | 2 00 | 2 27 | 2 24 | 0 24 | 1 00 | 2 20 | 2 20 | 1 20 |
| July | 2 20 | 2 24 | 1 00 | 2 17 | 2 23 | 1 20 | 2 00 | 0 00 | 2 24 | 4 00 |
| August | 2 00 | 4 00 | 4 20 | 2 19 | 2 21 | 0 20 | 2 14 | 2 27 | 1 20 | 1 20 |
| September | 2 00 | 2 20 | 1 20 | 4 00 | 0 00 | 2 24 | 2 20 | 1 27 | 2 07 | 1 27 |
| October | 2 20 | 2 20 | 2 22 | 2 00 | 2 23 | 2 20 | 4 00 | 4 24 | 1 00 | 1 20 |
| November | 1 20 | 0 00 | 0 00 | 2 20 | 2 20 | 2 07 | 1 27 | 1 20 | 2 00 | 2 24 |
| Total | 20 00 | 41 26 | 24 02 | 27 20 | 40 00 | 40 20 | 41 11 | 44 20 | 42 00 | 28 00 |

FRESH POND AND SURROUNDINGS

Work on the completion of Kingsley Park was resumed this year, and the work has been finished as far as the grading and seeding.

The greater part of the planting of shrubs and trees has been done and little now remains to be finished the coming year. I would recom-

mend that the shelters for the look-offs be built this season, according to the plans furnished by French & Bryant.

Also that a drinking fountain and a suitable sanitary be established for the convenience of the people visiting this resort.

There should also be placed a number of park settees for the use of the public.

The Metropolitan water, which was in use at the date of last report, was shut off on December 27th, the Pond gauge reading at the time 16.05, and pumping from the Pond was resumed.

Arrangements having been again made with the Metropolitan Water and Sewerage Board, on August 4th, when the Pond was at elevation 9.69, the water was again let on and continued in use until September 6th, when the Pond had reached elevation 14.41.

The following statement shows the amount of water purchased from the Metropolitan Water and Sewerage Board in 1904 and 1905:—

| | | |
|------------------------|-------------|----------|
| April, 1904 | 27,200,000 | gallons. |
| May | 274,400,000 | " |
| June | 29,940,000 | " |
| November | 48,100,000 | " |
| December | 251,900,000 | " |
| August, 1905 | 221,670,000 | " |
| September | 47,500,000 | " |
| | <hr/> | |
| | 900,710,000 | " |

Price paid for same — \$42,458.50.

The water from the new conduit was let on November 2nd, the Pond level being at the time, 11.86. The level of the Pond on December 2nd, was 12.80, a gain of nearly one foot.

The grass not needed for use of the Department has been sold at auction.

Average height of the Pond for the year has been 12.91 feet.

I would recommend that the next work undertaken at the Pond be the finishing of the roadway on the westerly side of the Pond leading from Huron Avenue to the corner of Washington Street. This roadway is completed to sub-grade and with the exception of the entrance from Huron Avenue very little heavy grading would need to be done. The great part of the expense would be the surfacing of the roadway.

The grounds, roadways and walks about the Pond have received the usual care.

FRESH POND RESERVOIR.

| | | | | INTAKE GATE. | | | |
|-----------|----|-------|-------|---|--|-------------------------------|--|
| | | | | This gate has been closed daily for one half hour in the morning and one half hour in the afternoon i. e. 8 a. m. to 8.30 a. m. and 4 to 4.30 p. m. for the purpose of expelling the air from the heavy brook main. | | | |
| | | | | 10 feet opening | | 15 feet opening | |
| | | | | Open | | Open | |
| | | | | During entire month, 20 turns | | During entire month, 20 turns | |
| 1904 | | | | | | | |
| December | 1 | 12.07 | | | | | |
| December | 25 | | 12.10 | 1.20 | | | |
| 1905 | | | | | | | |
| January | 1 | | 12.07 | | | | |
| January | 21 | 12.06 | 12.07 | 2.07 | | | |
| February | 1 | | 12.06 | | | | |
| February | 20 | 12.06 | | 1.00 | | | |
| March | 1 | | 12.06 | | | | |
| March | 21 | 12.06 | | 2.24 | | | |
| April | 1 | | 12.05 | | | | |
| April | 20 | 12.05 | | 2.07 | | | |
| May | 1 | | 12.05 | | | | |
| May | 21 | 11.59 | | 1.20 | | | |
| June | 1 | | 11.57 | | | | |
| June | 20 | 11.57 | | 4.41 | | | |
| July | 1 | | 11.56 | | | | |
| July | 21 | 9.53 | | 1.20 | | | |
| August | 1 | | 9.50 | | | | |
| August | 21 | | 12.10 | 3.05 | | | |
| September | 1 | 12.20 | | | | | |
| September | 1 | | 12.41 | 3.07 | | | |
| October | 1 | 12.20 | | | | | |
| October | 21 | | 11.55 | 1.20 | | | |
| November | 1 | 11.40 | | | | | |
| November | 20 | | 12.10 | 1.01 | | | |
| | | | | 22.20 | | | |

PUMPING STATION AND GROUNDS

The buildings and grounds are in good condition and have required no repairs this year.

The engines and boilers are in good condition. A new set of grate bars have been furnished No. 2 boilers.

The usual repairs have been made by the regular force at the station.

The Leavitt engine has pumped all the water used from the Pond and has never performed its work as satisfactorily as during the past year.

The Chief Engineer's report is appended.

ENGINE

* Average daily coal used while pump was in use.

**OPERATING EXPENSES AT PUMPING
STATION.**

| | |
|--|-------------|
| Advertising | \$9 50 |
| Building repairs | 151 04 |
| Carpentry | 10 08 |
| Disinfectants | 2 00 |
| Electrical work and supplies | 102 78 |
| Engine and boiler repairs and supplies | 206 69 |
| Expressage | 7 53 |
| Fuel | 5,983 08 |
| Grates | 273 33 |
| Hardware, tools and repairs | 249 35 |
| Ice | 15 60 |
| Lumber | 7 08 |
| Oil, waste and packing | 426 80 |
| Painting | 3 40 |
| Sealer of weights and measures | 1 64 |
| Telephone | 81 30 |
| Wall repairs | 44 00 |
| | <hr/> |
| | \$7,575 20 |
| Salaries and labor | 7,485 72 |
| | <hr/> |
| | \$15,060 92 |

THE FORTY INCH STEEL DISTRIBUTING MAIN

No leaks have occurred on this main during the year. The portions across the railroad tracks and over the cut at Holworthy Street should be scraped and painted the coming season.

PAYSON PARK RESERVOIR

The grounds about the Reservoir have received a coat of dressing where needed and are in good condition.

The stone and brick work of the gate house has been thoroughly repaired and the wood work painted and the building is now in first-class condition.

The former keeper Alfred Mason, who had been in charge at the Reservoir since its completion, died last August and T. J. Reagan has been appointed by the Board in his place.

PIPE YARD

The dwelling house at the Yard should be shingled this year.

The sheds are also in bad condition, needing shingling and new sills under a portion of them.

I would recommend that storage sheds be built this year along the westerly line of the lot, these are very much needed as a large part of our stock cannot be properly stored at present. We have on hand from the pipeline a large amount of material that can be used for this purpose to great advantage.

HIGH SERVICE

Following is the list of streets supplied from the high service.

| | |
|--------------------------------------|--------------------------------------|
| Agassiz Street | Holy Avenue |
| Agassiz Street from Highland Street | Humboldt Street |
| to Bay and Hutchinson Street | Huron Avenue from Agassiz Street |
| Armadillo Street | to Raymond Street |
| Avenue H. Street | Lancaster Street |
| Baker Street | Lansdown Street |
| Barnum Avenue | Mount Pleasant Street |
| Barnum Avenue West | Raymond Street from Lansdown Street |
| Barnes Vista Park | to Walker Street |
| Clayton Avenue from Huron Avenue | Reveries Street from Highland Street |
| to Northingham Street | Upland Road from Nicholas Avenue to |
| Carline Street from Huron Avenue to | Huron Avenue |
| Lansdown Street | Vandal Lane from Huron Avenue |
| Highland Street from Reveries Street | Violet Street |
| to Agassiz Street | Walnut Avenue |
| Nichols Avenue | Washington Avenue |

LIST OF CHECK VALVES IN USE.

Appleton Street at Hutchinson Street.

Avon Hill Street and Linnaean Street.

Concord Avenue at Buckingham Street.

Garden Street and Linnaean Street.

Raymond Street and Linnaean Street.

Upland Road near Mount Vernon Street.

Vincent Street at Walden Street.

LEAKAGE.

The total number of leaks for the year was two thousand one hundred ninety-one (2,191).

The following leaks were reported to and cared for by the Department : —

Two hundred four (204) on supplies.

Two (2) on hydrants.

Four (4) on gates.

Three (3) on street watering standpipes.

Five (5) on four-inch main pipes.

Nine (9) on six-inch main pipes.

Seven (7) on eight-inch main pipes.

One (1) on twelve-inch main pipe.

One (1) on twenty-four-inch main pipe.

One (1) on thirty-inch main pipe.

Total, two hundred thirty-seven (237).

Fourteen (14) of the leaks of the above statement were caused by electrolysis and thirteen (13) were caused by the Sewer Department construction.

The supplies on which forty-one (41) leaks occurred were renewed.

The Inspectors on the canvass discovered nineteen hundred fifty-four (1,954) leaks classified as follows : —

Sixteen hundred four (1,604) on water closets.

Three hundred thirteen (313) on faucets.

Sixteen (16) on tanks.

Nineteen (19) on supplies.

Two (2) on water valves.

These leaks were repaired by the owner of premises.

The leak on the old pumping main at the corner of Huron Avenue and Fayerweather Street has been to date, an expense of one thousand twenty two dollars and ninety five cents (\$1,022.95). This amount does not include the claims for damages that are pending.

Total leaks during the past five years

| | |
|------|-------|
| 1901 | 2,309 |
| 1902 | 2,259 |
| 1903 | 2,291 |
| 1904 | 2,114 |
| 1905 | 2,191 |

TABLE SHOWING GAIN IN THE TOTAL CONSUMPTION FOR THE YEAR 1905 OVER THE YEAR 1904

| | Total Consump
Dec 1904 | Total Consump
Dec 1905 | Increase | Decrease |
|-----------|---------------------------|---------------------------|------------|------------|
| 1904 | | | | |
| December | 202,000,120 | 172,300,000 | 29,700,120 | |
| 1905 | | | | |
| January | 170,000,000 | 204,000,000 | | 34,000,000 |
| February | 160,000,000 | 200,000,000 | | 40,000,000 |
| March | 170,000,000 | 200,000,000 | 30,000,000 | |
| April | 200,000,000 | 202,000,000 | 2,000,000 | |
| May | 200,000,000 | 170,000,000 | | 30,000,000 |
| June | 200,000,000 | 170,000,000 | | 30,000,000 |
| July | 200,000,000 | 170,000,000 | | 30,000,000 |
| August | 200,000,000 | 170,000,000 | | 30,000,000 |
| September | 200,000,000 | 170,000,000 | | 30,000,000 |
| October | 200,000,000 | 170,000,000 | | 30,000,000 |
| November | 200,000,000 | 170,000,000 | | 30,000,000 |
| Total | 1,700,000,000 | 1,700,000,000 | 0,000,000 | |

MAIN PIPE.

A new twelve-inch main pipe has been laid from the canal bridge in First Street through the new location of same street and up through Main Street on the north side towards the junction of Broadway. This pipe in Main Street is to take the place of the old eight-inch line which was laid in 1871.

A new line of eight-inch pipe has been laid on the south side of Main Street from Wadsworth Street to near the Parkway.

These new mains are connected together at the end near the West Boston Bridge.

The tables of main pipes will be found on pages 43 and 53.

Following are the streets in which the main pipes have been renewed :

In Chestnut Street from Magazine Street to Pearl Street, four hundred seventy (470) feet of six-inch have been laid ; the original pipe in this location was of four-inch and laid in 1871 and 1872.

In Greenough Avenue from Ellsworth Avenue to Highland Avenue, three hundred sixty (360) feet of four-inch pipe have been laid. The old four-inch pipe formerly supplying this vicinity was laid in 1875, 1876, 1881.

In Huron Avenue from Lake View Avenue to Lexington Avenue, the old four-inch main laid in 1888 and 1889 has been removed and three hundred fifty-six (356) feet of six-inch pipe laid.

In Tremont Street from Cambridge Street, north, the old four-inch pipe laid in 1869, has been removed and four hundred sixty-eight (468) feet of six-inch pipe laid in its place.

The annual blowing off of main pipes in all sections of the City has been of great benefit in improving the quality of the water.

The usual number of complaints of the disturbed condition of the water have been remedied during the year — outside of the annual blowing off.

In sixteen (16) locations the blow-offs have been reset.

In the several streets where the Sewer Department has constructed sewers, the main pipes have been offset and in cases where there were abandoned mains, they have been removed for the accommodation of the sewer locations.

The improvement of Broad Canal by the Charles River Dam Commission makes necessary the changing of the water mains now crossing at First, Third and Sixth Streets.

The water pipes are now laid in the mud and are of smaller sizes than are desirable in view of the future growth of the City and the fact that the section supplied is largely manufacturing.

As electrolysis may very seriously affect these submerged pipes, I would recommend that tunnels be constructed at these points and that the pipes be laid in them. I have no doubt but that the Cambridge Gas

Light Company would be very glad to cooperate in this matter so that the expense might be put in the same structure.

MAIN FIRE Laid NUMBER OF GATES AND FIRE HYDRANTS

| | Feet | Size | Size | Hydrant |
|----------------|--------|-------|------|-----------|
| | | 12 in | | |
| A 1st Street | 125 | 12 | | |
| A 2nd Street | | | 12 | |
| A 3rd Street | 64 | 6 | | (Hydrant) |
| A 4th Street | | | | |
| A 5th Street | 21 | 6 | 6 | (Hydrant) |
| A 6th Street | 20 | 6 | | (Hydrant) |
| A 7th Street | 20 | 6 | | |
| A 8th Street | 21 | 6 | | (Hydrant) |
| A 9th Street | 21 1/2 | 6 | 6 | |
| A 10th Street | 6 1/2 | 6 | | |
| A 11th Street | 21 | 6 | | (Hydrant) |
| A 12th Street | 20 | 6 | | (Hydrant) |
| A 13th Street | | | | |
| A 14th Street | 21 | 6 | 6 | (Hydrant) |
| A 15th Street | 21 | 6 | | |
| A 16th Street | 21 | 6 | | (Hydrant) |
| A 17th Street | 21 | 6 | | |
| A 18th Street | 21 | 6 | | (Hydrant) |
| A 19th Street | 21 | 6 | | |
| A 20th Street | 21 | 6 | | (Hydrant) |
| A 21st Street | 21 | 6 | | |
| A 22nd Street | 21 | 6 | | (Hydrant) |
| A 23rd Street | 21 | 6 | | |
| A 24th Street | 21 | 6 | | (Hydrant) |
| A 25th Street | 21 | 6 | | |
| A 26th Street | 21 | 6 | | (Hydrant) |
| A 27th Street | 21 | 6 | | |
| A 28th Street | 21 | 6 | | (Hydrant) |
| A 29th Street | 21 | 6 | | |
| A 30th Street | 21 | 6 | | (Hydrant) |
| A 31st Street | 21 | 6 | | |
| A 32nd Street | 21 | 6 | | (Hydrant) |
| A 33rd Street | 21 | 6 | | |
| A 34th Street | 21 | 6 | | (Hydrant) |
| A 35th Street | 21 | 6 | | |
| A 36th Street | 21 | 6 | | (Hydrant) |
| A 37th Street | 21 | 6 | | |
| A 38th Street | 21 | 6 | | (Hydrant) |
| A 39th Street | 21 | 6 | | |
| A 40th Street | 21 | 6 | | (Hydrant) |
| A 41st Street | 21 | 6 | | |
| A 42nd Street | 21 | 6 | | (Hydrant) |
| A 43rd Street | 21 | 6 | | |
| A 44th Street | 21 | 6 | | (Hydrant) |
| A 45th Street | 21 | 6 | | |
| A 46th Street | 21 | 6 | | (Hydrant) |
| A 47th Street | 21 | 6 | | |
| A 48th Street | 21 | 6 | | (Hydrant) |
| A 49th Street | 21 | 6 | | |
| A 50th Street | 21 | 6 | | (Hydrant) |
| A 51st Street | 21 | 6 | | |
| A 52nd Street | 21 | 6 | | (Hydrant) |
| A 53rd Street | 21 | 6 | | |
| A 54th Street | 21 | 6 | | (Hydrant) |
| A 55th Street | 21 | 6 | | |
| A 56th Street | 21 | 6 | | (Hydrant) |
| A 57th Street | 21 | 6 | | |
| A 58th Street | 21 | 6 | | (Hydrant) |
| A 59th Street | 21 | 6 | | |
| A 60th Street | 21 | 6 | | (Hydrant) |
| A 61st Street | 21 | 6 | | |
| A 62nd Street | 21 | 6 | | (Hydrant) |
| A 63rd Street | 21 | 6 | | |
| A 64th Street | 21 | 6 | | (Hydrant) |
| A 65th Street | 21 | 6 | | |
| A 66th Street | 21 | 6 | | (Hydrant) |
| A 67th Street | 21 | 6 | | |
| A 68th Street | 21 | 6 | | (Hydrant) |
| A 69th Street | 21 | 6 | | |
| A 70th Street | 21 | 6 | | (Hydrant) |
| A 71st Street | 21 | 6 | | |
| A 72nd Street | 21 | 6 | | (Hydrant) |
| A 73rd Street | 21 | 6 | | |
| A 74th Street | 21 | 6 | | (Hydrant) |
| A 75th Street | 21 | 6 | | |
| A 76th Street | 21 | 6 | | (Hydrant) |
| A 77th Street | 21 | 6 | | |
| A 78th Street | 21 | 6 | | (Hydrant) |
| A 79th Street | 21 | 6 | | |
| A 80th Street | 21 | 6 | | (Hydrant) |
| A 81st Street | 21 | 6 | | |
| A 82nd Street | 21 | 6 | | (Hydrant) |
| A 83rd Street | 21 | 6 | | |
| A 84th Street | 21 | 6 | | (Hydrant) |
| A 85th Street | 21 | 6 | | |
| A 86th Street | 21 | 6 | | (Hydrant) |
| A 87th Street | 21 | 6 | | |
| A 88th Street | 21 | 6 | | (Hydrant) |
| A 89th Street | 21 | 6 | | |
| A 90th Street | 21 | 6 | | (Hydrant) |
| A 91st Street | 21 | 6 | | |
| A 92nd Street | 21 | 6 | | (Hydrant) |
| A 93rd Street | 21 | 6 | | |
| A 94th Street | 21 | 6 | | (Hydrant) |
| A 95th Street | 21 | 6 | | |
| A 96th Street | 21 | 6 | | (Hydrant) |
| A 97th Street | 21 | 6 | | |
| A 98th Street | 21 | 6 | | (Hydrant) |
| A 99th Street | 21 | 6 | | |
| A 100th Street | 21 | 6 | | (Hydrant) |

STREETS

The total number of streets is 100. The number of streets is 100. The number of streets is 100.

See page 53 for account of number and size of streets, etc., etc.

One hundred twenty-one (121) supplies were laid of galvanized wrought iron pipe in sizes, from three-quarter-inch to two-inch inclusive and nine (9) were of cast-iron pipe and were located as follows :—

6-inch for Blanchard Machine Co., State Street.
 8-inch for Boston & Maine, Bridge Street.
 6-inch for Cambridge Gas Light Company, Athenaeum Street.
 6-inch for Ginn & Company, Athenaeum Street.
 6-inch for Edward C. Sherburne
 6-inch for Memorial Hall, Cambridge Street.
 4-inch for Stillman Infirmary, Mount Auburn Street.
 6-inch for Ward-Corby Company, Albany Street.
 6-inch for Warren Brothers, Potter Street.

Seven (7) supplies were laid for the temporary use of the Sewer Department. They have been removed and are not included in the above list.

As requested from time to time during the year, the Sewer Department has been accommodated by offsetting supplies where they have conflicted with the construction of the sewers.

On account of the change in the lines and resurfacing of Main Street, the supplies have been renewed from the new main to the property lines.

One hundred seventy-six (176) supplies have been renewed in locations where the original supply was inadequate, leaking or too old for further use. In addition to these, the supplies, as designated in the following streets, were renewed as the main pipe in street was renewed or by request of Street Department which was constructing new street surface :—

| | | | | | |
|------------------|---|---|---|---|----|
| Cambridge Street | . | . | . | . | 12 |
| Chestnut Street | . | . | . | . | 3 |
| Concord Avenue | . | . | . | . | 13 |
| Greenough Avenue | . | . | . | . | 6 |
| Huron Avenue | . | . | . | . | 2 |
| Lambert Street | . | . | . | . | 19 |
| Orchard Street | . | . | . | . | 5 |
| Putnam Avenue | . | . | . | . | 9 |
| Tremont Street | . | . | . | . | 22 |
| Union Place | . | . | . | . | 4 |
| Warren Street | . | . | . | . | 22 |

Total number of supplies renewed during the year was two hundred sixty three (263).

(One hundred seventy seven (177) service taxes have been set on old supplies

The service taxes on supplies in all parts of the City were inspected in the Spring as usual and as necessary were raised or lowered. Outside of this annual inspection in sixty seven (67) cases, the service taxes have been changed to conform to the sidewalk elevation.

Seventy two (72) supplies were thawed out by the Department last Winter and Spring

Following is the list of establishments having fire protection from the City of Cambridge

| | | |
|-------------------------------------|------------------------------------|-------------|
| American Rubber Co. | Blaney Street. | Two 6 in |
| American Net & Twine Co. | Third Street. | Two 6 in |
| American Net & Twine Co. | Third Street. | 6 in |
| American Vulcanized Fibre Co. | Tannery Street. | 3 in |
| Barber Asphalt Paving Co. | First Street. | 6 in |
| Bay State Metal Works. | Harvard Street. | 6 in |
| Blanchard & Shepard. | Churn Street. | 3 in |
| Blake, George F. Manufacturing Co. | Blaney Street. | 6 in |
| " | Third Street. | 6 in |
| Blanchard Machine Co. | State Street. | 6 in |
| Boston Book Binding Co. | Mt. Auburn Street. | 6 in & 6 in |
| Boston Elevated Railway Co. | Halden Street. | 3 in & 6 in |
| " | Cambridge Street. | Two 3 in |
| " | Pelham Street. | Three 6 in |
| " | Massachusetts Avenue. | 6 in |
| " | Mt. Auburn Street. | 6 in & 3 in |
| " | Murray Street. | 6 in |
| " | River Street. | 6 in |
| Boston & Maine Railroad. | Bridge Street. | 6 in |
| " | Bridge Street. | 6 in |
| " | East Street. | 6 in |
| " | Prison Point Street. | 6 in |
| Boston Woven Glass & Rubber Co. | Portland Street. | Two 6 in |
| Cambridge Gas Light Co. | Third Street. | 6 in |
| Cambridge Electric Light Co. | Western Avenue. | 6 in |
| Cambridge Laundry | Kinnaird Street. | 6 in |
| Cambridge Mutual Fire Insurance Co. | Massachusetts Avenue. | 3 in |
| Chelmsford Foundry Co. | Portland Street. | 3 in |
| Dover Stamping Co. | Flannett Street. | 6 in |
| Cook & Co. | First Street. | Two 6 in |
| " | Athenaeum Street. | 6 in |
| Cropper Bros. | Ninth Street. | 1 1/2 3 in |
| Harvard University. | Harvard Lane, Harvard St. | 6 in |
| " | Memorial Hall, Cambridge St. | 6 in |
| " | Observatory, Concord Ave. | 6 in |
| " | Smithsonian Museum, Inverness Ave. | 6 in |

| | | |
|--|------------------------------------|--------------|
| Hews, A. H., Co., | Crescent Avenue, | Two 4-in. |
| Holy Ghost Hospital for Incurables, | Hovey Avenue, | 3-in. |
| Houghton, Mifflin & Co., | Albro & Blackstone Streets, | 6-in. |
| " " " " | River Street, | 6-in. |
| Irving & Casson, | Otis Street, | 6-in. |
| " " " " | Thorndike Street, | Two 6-in. |
| " " " " | Thorndike Street, | 2-in. |
| Ivers & Pond Piano Co., | Albany Street, | 4-in & 6-in. |
| Keeler & Co., | Thorndike Street, | 1-in. |
| Kendall, Edward, & Sons, | Main Street, | 2-in. |
| Lamb & Ritchie, | Albany Street, | 6-in. |
| Lever Bros. Co., | Broadway, | 6-in. |
| " " " " | Broadway, | 8-in. |
| Little, Brown & Co., | Putnam Avenue, | 6-in. |
| Lockhart, Wm. L., & Co., | First Street, | 6-in. |
| Luke, E. H., Estate of, | Main Street, | 2-in. |
| Mason & Hamlin Co., | Broadway, | Two 6-in. |
| McLean, Isaac, | Mt. Auburn Street, | 4-in. |
| McLean, Isaac, | Massachusetts Avenue, | 4-in. |
| Metropolitan Storage Warehouse Co., | Massachusetts Avenue, | 6-in. |
| Middlesex C'ty, House of Correction, | Second & Spring Streets, | 6-in. |
| National Biscuit Co., | Franklin Street, | 4-in. |
| " " " " | Franklin Street, | 6-in. |
| " " " " | Green Street, | 8-in. , |
| National Linseed Oil Co., | Fifth Street, | 6-in. |
| North Packing & Provision Co., | Winsor Street, | 6-in. |
| O'Brien, John (Rev.), | Seventh Street, | 4-in. |
| Page, Geo. G., Box Co., | Hampshire Street, | Two 6-in. |
| Petterson, Oscar G., | 483 Main Street, | 4-in. |
| Pierce, Thomas, Trustee of Estate of, | Broadway, | 6-in & 4-in. |
| Pi Eta Club, | Winthrop Street, | 2-in. |
| Porter, Henry S., | Kinnaird Street, | 4-in. |
| Reardon, John, & Sons, Corporation, | Waverly Street, | 4-in. |
| Reardon, William, | Portland Street, | 2-in. |
| Revere Sugar Refinery, | Water Street, | 6-in. |
| Reversible Collar Co., | Putnam Street, | 6-in. |
| Russell, Lucy J., | 29 Elm Street, | 1-1-2-in. |
| Rice, P. G., & Co., | Massachusetts Ave. & Lee St., | Two 2-in. |
| Sawyer, Howard M., & Son, | Thorndike Street, | 4-in. |
| " " " " | Second Street, | 6-in. |
| Seavey Manufacturing Co., | Third Street, | 6-in. |
| Seelye Manufacturing Co., | First Street, | 4-in. |
| Sherburne, Edward C., | Pacific Street, | 6-in. |
| Simplex Electrical Co., | Auburn Street, | 3-in. |
| " " " " | Auburn Street, | 6-in. |
| " " " " | Franklin Street, | 8-in. |
| Slavens, Luther R., | Broadway, | 2-in. |
| Sparrow, H. F., & Co., | Hampshire Street, | 6-in. |
| Speare's, Alden, Sons & Co., | Rogers Street, | 4-in. |
| " " " " | Sixth Street, | 4-in. |
| Standard Oil Co., | Potter Street, | 6-in. |
| Standard Turning Works, | Main Street, | 2-in. |
| Thayer & Co., Henry, | Broadway, | 6-in. |
| Tower, Sylvester, & Son, | Broadway, | 4-in. |
| University Associates, | Linden Street, | 4-in. |
| " " " " | Massachusetts Avenue, | 6-in. |

| | | |
|----------------------|-------------------------------|------|
| University Press, | Notting Place, | 6 in |
| Ward, Corby & Co., | Albany Street, | 6 in |
| Warren Bros., | Porter Street, | 6 in |
| Westmore, C. D. | Claverly Hall, Mt Auburn St., | 6 in |
| Whittemore Brothers, | Albany Street, | 6 in |

DRINKING FOUNTAINS

The number of drinking fountains and troughs remains unchanged, i. e., twenty-eight (28).

Of the above number, four (4) are of the Jenks manufacture and are ice water drinking fountains. These were supplied with ice at an expense to the Water Department, from June 15th to October 26th, inclusive, as follows:

| | |
|--------------------------|----------|
| Central Square fountain | \$129 20 |
| East Cambridge fountain | 123 25 |
| Harvard Square fountain | 103 43 |
| North Cambridge fountain | 135 30 |
| | <hr/> |
| | \$491 18 |

Average cost per day of supplying ice 132 days for these fountains was per fountain, 94 cents.

In response to the calling the Department's attention to acts of 1902 by the Cattle Bureau of State Board of Agriculture, the fountains and troughs have been carefully watched and cleaned.

In all sections of the City the fountains have been painted and the usual and necessary repairs made.

STREET WATERING STANDPIPES

Sixty-five (65) street watering standpipes are in use at this date, November 30, 1903.

Thirty-nine (39) standpipes have been repaired during the year.

The cost of these repairs has been met by the Street Watering Department, as has been the custom in previous years.

GATES

Twenty-seven (27) new gates have been set during the year (see recapitulation table, page 24).

Seven (7) have been placed on renewals of main pipe.

Sixteen (16) have been placed on new mains (extensions).

Four (4) have been placed on supplies.

The gates have been given their annual inspection and found in good condition.

Their locations have been carefully marked.

BOXES.

There have been eighty-seven (87) boxes set this year.

Twenty-one (21) iron and two (2) small wooden have been set on extensions and renewals of main pipe.

Five (5) special wooden and thirteen (13) Merrill boxes have been set on meters.

Ten (10) iron boxes have been set on new supply work.

Two (2) flush hydrants, two (2) wooden and thirty-two (32) iron boxes have been set in place of worthless ones removed.

The gate boxes in all parts of the City have been inspected and repaired.

Upon request by Street Department or as changes in street grades have required, the boxes have been raised or lowered to conform to new elevation.

This care has also been given to those that have been affected by frost.

HYDRANTS.

Total number of hydrants in use at this date, November 30, 1905, is one thousand thirty-one (1,031).

| | | | | | | | | |
|---------|---|---|---|---|---|---|---|-------------|
| Boston | . | . | . | . | . | . | . | 156 |
| Chapman | . | . | . | . | . | . | . | 567 |
| Coffin | . | . | . | . | . | . | . | 41 |
| Flush | . | . | . | . | . | . | . | 87 |
| Holyoke | . | . | . | . | . | . | . | 89 |
| Perkins | . | . | . | . | . | . | . | 91 |
| | | | | | | | | <hr/> 1,031 |

Twenty-eight (28) hydrants have been set during the year: Thirteen (13) in new locations and fifteen (15) in place of old or disabled ones removed.

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1-

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(The flush hydrant has been removed from East Street as it will be no longer needed there. Flush hydrants have been removed from the streets following. --

Cambridge Street at Massachusetts Avenue

East Street.

Everett Street (2).

Kirkland Street at Baldwin Street.

Kirkland Street at Oxford Street.

Kirkland Street at Trowbridge Street.

Main Street (117).

Main Street at First Street.

Massachusetts Avenue at Arlington Street.

Tremont Street at Cambridge Street.

Post hydrants have been removed from the streets following:

Concord Avenue at Craigie Street (Holyoke).

Front Street near Forest Street (Boston).

Hampshire Street at Page Box Company (Coffin).

Prison Point Street (Boston).

In fourteen (14) locations the post hydrants have been repaired.

In Cedar Street, Nargent Street, Tannery Street and Trowbridge Street the hydrants have been relocated.

There have been two Chapman hydrants sold to and set for the Cambridge Gas Light Company on its premises on Second Street.

The need of uniformity in hose couplings of hydrants has recently been emphasized in the great fires at Baltimore and Rochester.

Our hydrants have always had the 3-inch connection instead of the 2 1/2-inch which has been adopted by the following associations interested:

American Water Works Association.

National Fire Protection Association.

National Board of Fire Underwriters.

Committee of the National Board of Fire Underwriters.

New England Water Works Association.

National Firemen's Association

International Association of Fire Engineers.

Our Chief of Fire Department has urged in his report the change, and I would recommend that in future all hydrants purchased be fitted with the standard outlets and that the hydrants in use be changed as rapidly as possible.

METERS.

Three hundred forty-six meters have been set this year in locations which were not covered by meter on November 30, 1904, as follows:—

| | 2
inch. | 1 1-2
inch. | 1
inch. | 3-4
inch. | 5-8
inch. | Total. |
|--------------------|------------|----------------|------------|--------------|--------------|--------|
| Crown..... | ..... | ..... | 1 | 2 | ..... | 3 |
| Hersey | 1 | ..... | 4 | 11 | 21 | 37 |
| Lambert..... | ..... | ..... | ..... | 1 | 3 | 4 |
| Nash.. ..... | ..... | ..... | ..... | 1 | ..... | 1 |
| Trident ..... | ..... | 1 | 2 | 9 | 12 | 24 |
| Union Rotary | 2 | 1 | ..... | ..... | ..... | 3 |
| Worthington..... | 2 | 4 | 7 | 30 | 231 | 274 |
| | 5 | 6 | 14 | 54 | 267 | 346 |

Total number of meters in use on domestic supplies, churches and manufactories, at this date, November 30, 1905, is twenty-eight hundred eighty-six (2,886).

| | 6
inch. | 4
inch. | 3
inch. | 2
inch. | 1 1-2
inch. | 1
inch. | 3-4
inch. | 5-8
inch. | Total. |
|--------------------|------------|------------|------------|------------|----------------|------------|--------------|--------------|--------|
| Ball & Flits..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | ..... | 1 |
| Crown..... | ..... | 2 | ..... | 7 | 4 | 6 | 15 | 9 | 43 |
| Empire ..... | ..... | ..... | ..... | ..... | ..... | 2 | ..... | ..... | 2 |
| Gem..... | 1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 |
| Hersey | 1 | 1 | 4 | 21 | 15 | 118 | 290 | 743 | 1,193 |
| Keystone ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 57 | 57 |
| Lambert..... | ..... | ..... | ..... | ..... | ..... | 5 | 34 | 92 | 131 |
| Nash..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 13 | 13 |
| Thomson ..... | ..... | ..... | ..... | ..... | 1 | ..... | 3 | 5 | 9 |
| Trident..... | ..... | ..... | 5 | 14 | 21 | 104 | 235 | 374 | 753 |
| Union Rotary | 1 | 9 | 7 | 15 | 11 | 2 | 10 | 12 | 67 |
| Worthington..... | ..... | 2 | 4 | 15 | 16 | 40 | 70 | 469 | 616 |
| | 3 | 14 | 20 | 72 | 68 | 278 | 667 | 1,774 | 2,886 |

And forty-eight (48) in public buildings, for which the Department receives no income.

These meters are placed on the buildings in use by the City, *i. e.*, schools, engine houses, stations, etc., in order to determine the amount of water used for such purposes:—

| | 1
inch | 1 1/2
inch | 2
inch | 3 1/2
inch | 4 1/2
inch | Total |
|----------------|-----------|---------------|-----------|---------------|---------------|-------|
| Ball & Pike | | | 1 | | | 1 |
| Cherry | 1 | 1 | 1 | | 1 | 4 |
| Harvey | | | 1 | 1 | | 2 |
| Trident | | | 1 | 1 | 1 | 3 |
| Thompson | | 1 | | | | 1 |
| Edison Battery | 1 | | | | | 1 |
| Warrington | | | 1 | 1 | 1 | 3 |
| | 2 | 2 | 4 | 2 | 2 | 12 |

STONY BRINK PIPE LINE.

That portion of this line from Fresh Pond to Irving Street in Watertown where the new concrete conduit begins has been out of use since November 2nd and the air ejector at Holworthy Street has been removed. The rest of the line has developed no leaks and is apparently in good condition.

The air valves have been opened frequently and everything done possible to keep the flow up to the maximum.

Readings from the Venturi meter have been taken monthly.

The gate house at the 36-inch blow-off is in bad condition. I would recommend that it be covered with galvanized iron for protection.

STONY BRINK.

Four new cesspools have been constructed during the year, making twenty-seven cesspools and eighteen vaults now cared for by this Department.

The water in this basin has been kept as high as thought safe during the past year, in order that the flow to Fresh Pond might be as large as possible.

HOBBS BRINK.

The keeper's house at the basin will need painting this year. A bathroom has been supplied the past season and water from the well brought into the house.

All standing grass not needed has been sold as in former years.

The buildings on the Egan's farm, which were sold last year, have been removed.

The bridge at the Lincoln Street dam has been replanked.

The average elevation of water in this basin for the past year has been 181.30 feet, the highest, 181.75 feet, and the lowest, 180.15 feet.



RECAPITULATION

NEW SUPPLIES

| | 1/2 inch | 3/4 inch | 1 inch | 1 1/4 inch | 1 1/2 inch | 2 inch | 3 inch | 4 inch | Total |
|------------------------|----------|----------|--------|------------|------------|--------|--------|--------|-------|
| Length in feet of pipe | 24 | 251 | 254 | 171 | 471 | 771 | 1,001 | 2,207 | 4,954 |
| Number of tees | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| Number of 90° elbows | | | | | | | | | |
| Number of 45° elbows | | | | | | | | | |
| Number of gate valves | 1 | 1 | 1 | | | | | | 4 |
| Number of gate boxes | | | | | | | | | 10 |

MAIN PIPE

| | 12 inch | 14 inch | 16 inch | 18 inch | 20 inch | 22 inch | 24 inch | Total |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|-------|
| Length in feet of pipe | 120 | 24 | 1,731 | 2,224 | 224 | 240 | 110 | 4,673 |
| Length in feet of pipe | 120 | 24 | 1,731 | 2,224 | 224 | 240 | 110 | 4,673 |
| Total length in feet of pipe | 120 | 24 | 1,731 | 2,224 | 224 | 240 | 110 | 4,673 |
| Number of gates | 1 | | 1 | 1 | 1 | | | 5 |
| Number of hydrants | | | | | | | | 10 |

TABLE SHOWING NUMBER OF GALLONS, BY THE MONTH, FLOWING OVER THE WATERWAYS AT STONY BROOK PARK

| | Gallons | Number of Days | | Gallons | Number of Days |
|----------|---------------|----------------|-----------|---------------|----------------|
| 1904 | | | May | 121,700,000 | 30 |
| December | 200,000 | 1 | June | 107,000,000 | 30 |
| | | | July | 200,000 | 1 |
| 1905 | | | August | | |
| January | 211,000,000 | 30 | September | 200,000,000 | 17 |
| February | 200,000 | 1 | October | | |
| March | 1,023,000,000 | 31 | November | | |
| April | 1,000,000,000 | 30 | | 2,100,000,000 | 100 |

Total amount wasted 2,100,000,000 gallons
 Total amount of days in which water wasted 100

COMPARATIVE TRENCHING FOR THE PAST TEN YEARS

| | Excavations | Recesses | Recesses | Total Feet | Days |
|------|-------------|----------|----------|------------|--------|
| 1900 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1901 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1902 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1903 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1904 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1905 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1906 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1907 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1908 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1909 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |
| 1910 | 1,021 | 20,000 | 1,021 | 61,000 | 11,000 |

PUMPING STATION,
CAMBRIDGE WATER WORKS,
December 1, 1905.

Edwin C. Brooks, Superintendent, Cambridge Water Works : —

DEAR SIR : — I would report that the Leavitt Engine has pumped the water for the year with the exception of the Metropolitan supply. The Fort Wayne dynamo, which was repaired, and the new grates in No. 2 boiler have given good satisfaction.

The employees at the station have made all the needed repairs, which were considerable, during the time the City was using Metropolitan water.

Respectfully submitted,

WILLIAM H. BLAISDELL,
Engineer.

SUMMARY OF STATISTICS

For the Year Ending November 30, 1905.

In form recommended by the New England Water Works Association

CAMBRIDGE WATER WORKS

CITY OF CAMBRIDGE, COUNTY OF MIDDLESEX, STATE OF MASSACHUSETTS.

GENERAL STATISTICS

Population by census of 1900 91,886

Date of construction 1885

By whom owned City of Cambridge

Source of supply Hobbs Brook and Stony Brook in Lincoln, Waltham and Weston, and Fresh Pond in Cambridge

Manner of supply Gravity from Hobbs and Stony Brooks to Fresh Pond, pumping from Fresh Pond to Payson Park Reservoir, thence by gravity to consumers

PUMPING STATISTICS

1 Builders of pumping machinery One Leavitt built by Greenham High Duty Pumping Engine Company, two Worthington, one Blake

2 Description of fuel used — a Kind bituminous

b Brand of coal Quonabonnet

c Price of coal per gross ton — delivered from December 1, 1904, to November 30, 1905, \$3.75 and \$4.00

3a Coal consumed for the year 3,589,640 lbs

b Coal consumed for pumping purposes only 3,498,195 lbs

c Pounds of wood consumed 3 equivalent amount of coal, 200 lbs

d Total equivalent coal consumed for the year for pumping purposes $b + c$, 3,498,395 lbs

| | Gallons. |
|---|---------------|
| 6a. Total pumpage for the year without allowance for slip | 2,773,089,640 |
| 6b. Total amount purchased from Metropolitan and Sewerage Board | 521,070,000 |
| 6c. Total consumption for the year | 3,294,159,640 |
| 7. Average static head against which pumps work — | 158.03 feet. |
| 8. Average dynamic head against which pumps work — | 194.44 feet |
| 9. Number of gallons pumped per pound of equivalent coal (5) — | 793. |
| 10. Duty = $\frac{2,773,089,640 \text{ gals. pumped} \times 8.34 (\text{lbs.}) \times 100 \times \text{dynamic head, } 194.44}{\text{Total fuel consumed, } 3,494,695}$ | 131,987,543 |
| Cost of pumping, figured on pumping station expenses, viz :
\$15,060.92. | |
| 11. Per million gallons pumped — | \$5.43. |
| 12. Per million gallons raised one foot (dynamic) — | .028. |

FINANCIAL STATISTICS FOR 1904.

| | | |
|--------------------------------|-------------------|--------------|
| Ordinary receipts | \$5,417 50 | |
| From consumers | 345,795 07 | |
| Abatements | 2,885 33 | |
| Construction account | 800 28 | |
| | <u> </u> | \$354,898 18 |

EXPENDITURES.

| Total Maintenance : | | Operating Expenses. |
|---|---------------------|---------------------|
| General expenses | \$22,404 95 | \$22,404 95 |
| Supply expense | 3,416 35 | |
| Salaries | 10,499 00 | 10,499 00 |
| Salaries, pumping | 7,485 72 | 7,485 72 |
| Pumping, general expense | 7,575 20 | 7,575 20 |
| Payson Park Reservoir | 1,483 09 | 1,483 09 |
| Fresh Pond Reservoir, general | 11,799 28 | 2,730 00 |
| Fresh Pond Reservoir, grading | 4,285 50 | |
| Hobbs Brook Reservoir | 1,756 71 | 1,756 71 |
| Stony Brook Reservoir | 2,195 21 | 2,195 21 |
| Ice | 484 29 | |
| Rent | 1,200 00 | 1,200 00 |
| Metropolitan Water and Sewerage Board | 28,458 50 | |
| Amount carried forward | <u>\$103,043 80</u> | <u>\$57,329 88</u> |

| | | |
|-------------------------------|--------------|-------------------|
| Amount brought forward | \$103,043 80 | |
| Interest on bonds | 138,806 80 | |
| Sinking fund | 121,522 50 | |
| Refunds and abatements | 4,761 40 | |
| | — — — — | \$364,137 20 |
| Construction | | |
| General | \$14,541 14 | |
| Hobbs Brook, land | 1,628 10 | |
| Hobbs Brook, general | 63 22 | |
| Hobbs Brook conduit | 226,137 47 | |
| City Solicitor | 200 00 | |
| Stony Brook main | 3,419 13 | |
| Meters | 4,343 51 | |
| | — — — — | \$251,232 57 |
| Cost of works to date | | \$6,023,739 70 |
| Bonded debt at date | | 3,646,000 00 |
| Value of Sinking Fund at date | | 1,382,428 84 |
| Average rate of interest | | 34 and 4 per cent |

STATISTICS OF CONSUMPTION OF WATER

- 1 Estimated total population at date 97,426
- 2 Estimated population on lines of pipe 97,426
- 3 Estimated population supplied 97,426
- 4 Total pumping for year — 2,773,049,640 gallons
- 4a Water purchased from Metropolitan and Sewerage Board — 521,070,000 gallons
- 4b Total consumption for the year 3,294,119,640 gallons
- 5 Passed through meters 1,240,369,750 gallons
- 6 Percentage of consumption metered 37 6 per cent.
- 7 Average daily consumption 9,025,045 gallons
- 8 Gallons per day to each inhabitant 92 63
- 9 Gallons per day to each consumer 92 63
- 10 Gallons per day to each tap 624
- 11 Cost of supplying water, per million gallons pumped, figured on total maintenance operating expenses \$20 67
- 12 Total cost of supplying water per million gallons pumped figured on total maintenance + interest on bonds

STATISTICS RELATING TO DISTRIBUTION SYSTEM.

MAINS.

Kind of pipe — cast iron.

Sizes — From 2-inch to 40-inch.

Extended — 5,817 feet during year.

Renewed — 2,263 feet during year.

Total now in use — 126.72 miles.

Number of leaks per mile — 18.

Length of pipes 2 and 3 inches diameter — 2 miles.

Number of hydrants added during year (public) — 13.

Number of hydrants (public) now in use — 1,031.

Number of stop gates added during year — 23.

Number of stop gates smaller than 4-inch — none.

Range of pressure on mains — 45 lbs. to 55 lbs.

SERVICES.

Kind of pipe — galvanized iron.

Sizes — Three-fourth inch to two inches of galvanized wrought iron pipe. 3-inch, 4-inch, 6-inch and 8-inch of cast iron pipe.

Extended — 6,251½ feet.

Estimated total now in use — 116.34 miles.

Number of service taps added during year — 121—¾-inch to 2-inch; one 4-inch; seven 6-inch; one 8-inch.

Number now in use — 14,933.

Average length of service — 44 feet (for the year).

Average cost of service for the year — \$18.38.

Number of meters added — 346.

Number now in use — 2,886.

Percentage of services metered — 19.

Respectfully submitted,

EDWIN C. BROOKS, *Superintendent.*

The following statement is from the report of the Commissioners of the Sinking Fund of the City of Cambridge, and shows the present condition of the Water Loan Sinking Fund

In

| | | |
|--|-------------------|----------------|
| The amount of the Fund November 30, 1904, was | \$1,210,606 74 | |
| The amount received from the City Treasurer of Cambridge being the annual requirements for 1905 derived from Water Rates was | 121,272 30 | |
| Interest received on invested funds | 44,210 91 | |
| | <u> </u> | \$1,376,089 95 |

On

| | | |
|--|---------------------|----------------|
| Paid accrued interest on investments purchased | \$807 16 | |
| Paid premiums on investments purchased | 932 03 | |
| Leaving the amount of the fund November 30, 1905 | <u>1,372,350 76</u> | \$1,372,350 76 |

The funded Water Debt, which the foregoing Fund is to pay matures as follows

| | | |
|------------------------|---------|-----------------------|
| Nov 1 1906 | \$ 1-20 | \$43 000 00 |
| Nov 1 1907 | do | 50 000 00 |
| Nov 1 1908 | do | 52 000 00 |
| July 1 1909 | do | 44 000 00 |
| Aug 1 1909 | do | 75 000 00 |
| July 1 1909 | do | 30 000 00 |
| May 1 1910 | do | 245 000 00 |
| July 1 1910 | do | 75 000 00 |
| Sept 1 1910 | do | 125 000 00 |
| Jan 1 1911 | do | 30 000 00 |
| Nov 1 1911 | do | 25 000 00 |
| Jan 1 1912 | do | 120 000 00 |
| Mar 2 1912 | do | 75 000 00 |
| Nov 1 1912 | do | 45 000 00 |
| Feb 1 1913 | do | 100 000 00 |
| Aug 1 1913 | do | 50 000 00 |
| April 1 1913 | do | 200 000 00 |
| Aug 1 1913 | do | 200 000 00 |
| April 1 1914 | do | 100 000 00 |
| July 1 1914 | do | 200 000 00 |
| Aug 1 1916 | do | 100 000 00 |
| Nov 1 1916 | do | 245 000 00 |
| April 1 1917 | \$ 1-20 | 200 000 00 |
| July 1 1917 | \$ 1-20 | 100 000 00 |
| Nov 1 1917 | \$ 1-20 | 75 000 00 |
| Dec 1 1917 | \$ 1-20 | 100 000 00 |
| May 2 1918 | \$ 1-20 | 50 000 00 |
| Amount carried forward | | <u>\$2 250 000 00</u> |

WATER LOAN SINKING FUND.

| | | | | | | | | |
|-------------------------------|---|---|--------|---|---|---|---|----------------------|
| <i>Amount brought forward</i> | | | . | . | . | . | . | \$2,839,100 00 |
| June 1, 1918 | . | . | 3 1-2s | . | . | . | . | 60,000 00 |
| Nov. 1, 1918 | . | . | 3 1-2s | . | . | . | . | 50,000 00 |
| Nov. 1, 1919 | . | . | 3 1-2s | . | . | . | . | 23,000 00 |
| Nov. 1, 1920 | . | . | 3 1-2s | . | . | . | . | 30,000 00 |
| July 1, 1921 | . | . | 3 1-2s | . | . | . | . | 30,000 00 |
| July 1, 1922 | . | . | 3 1-2s | . | . | . | . | 18,500 00 |
| Nov. 1, 1922 | . | . | 3 1-2s | . | . | . | . | 5,000 00 |
| April 1, 1924 | . | . | 4s | . | . | . | . | 300,000 00 |
| May 1, 1925 | . | . | 3 1-2s | . | . | . | . | 46,000 00 |
| May 1, 1926 | } 20 serial bonds, one bond of
\$12,500. to be paid each year,
from the receipts from rates | | | | | | | |
| to | | | | | | | | |
| May 1, 1925 | | | | | | | | 250,000 00 |
| | | | | | | | | <hr/> \$3,646,600 00 |



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